AUGUST
1959

FOUNDRY

A PENTON PUBLICATION

- Rotor Bodies for Motors Cast Centrifugally — Page 54
- How Design Can Influence Foundry Cooling — Page 57
- Graphitization Mechanism of Fe-C-Si Alloys — Page 60
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6085 Foundries

Their Products, Processes, and Location Page 62

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ONLY MAGCOBAR HAS ALL FOUR

the winning combination in your foundry operations

Magcobar
AGRICULTURAL AND INDUSTRIAL PRODUCTS

- ♥ YELLOWSTONE, Western Bentonite
- ♣ AUTO BOND, Bentonite for Gray Iron
- ♦ SOUTHERN STAR, Southern Bentonite
- ♠ and, MAGCOBAR SERVICE.

MAGNET COVE BARIUM CORP.

HOUSTON, TEXAS
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DES PLAINES, ILL.
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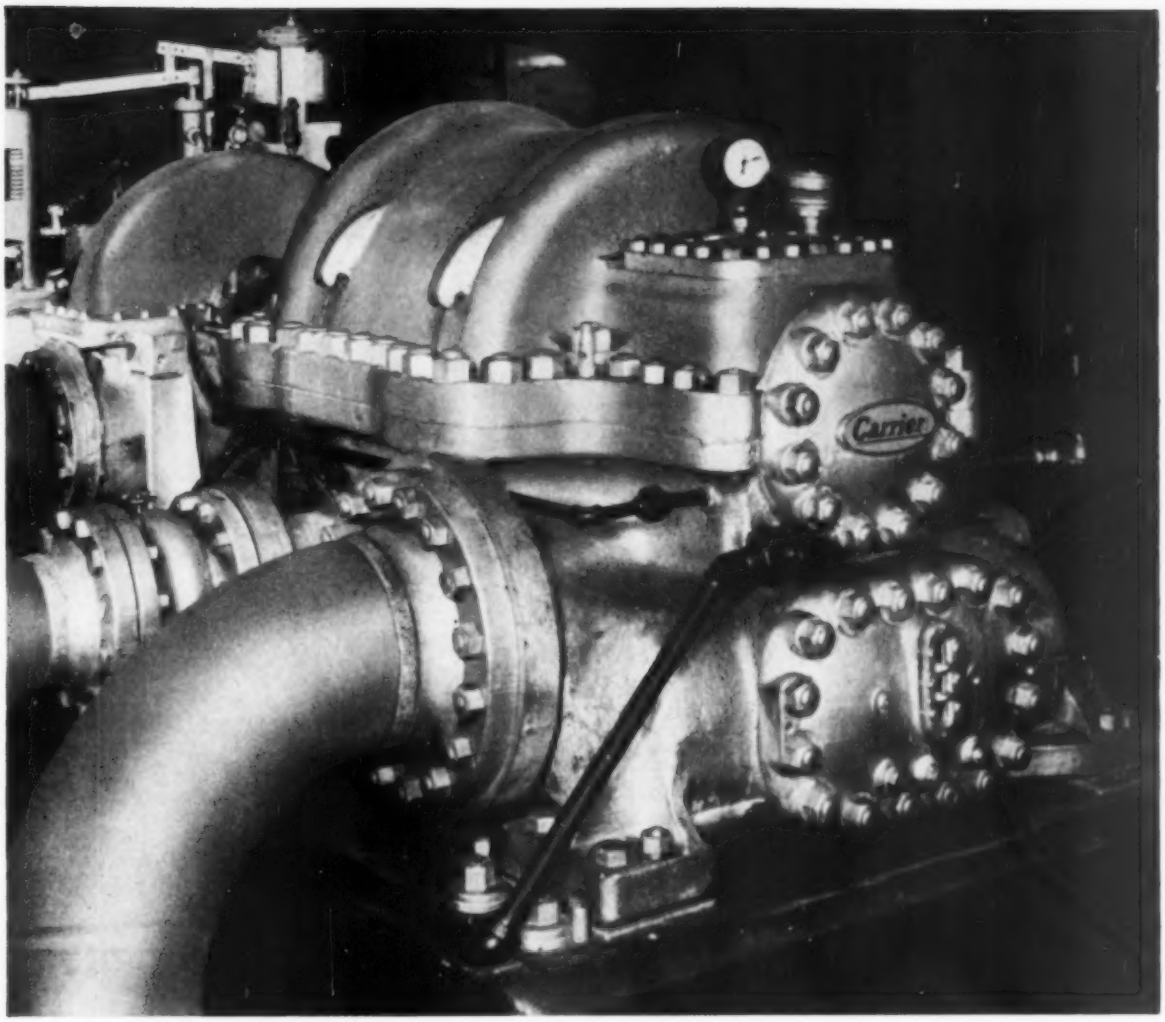
Circle 551 on Page 85



4½% Nickel plus good casting makes these casings strong and tough at–185°F

Here's how the foundry solved a low temperature problem:

This Carrier #350 Compressor is designed for producing ethylene by low temperature (–185°F) high pressure (600 psi) fractionation.

Under these conditions ordinary cast steel is brittle and could easily fracture. Could the foundry turn out castings which would have high strength and toughness at the low temperatures involved?

They could . . . this way:

They made these three-ton compressor housing castings from 4½% nickel alloy steel; normalized and water quenched them, and finally tempered them. Under this treatment the castings easily exceed these minimum mechanical properties:

Ultimate tensile strength	70,000 psi
Yield strength	40,000 psi
Elongation in 2"	22%
Reduction of area	30%
Charpy keyhole impact (@ –185°F)	15 ft. lb.

Nickel does wonders for cast irons and steels destined for severe service . . . aids development of desired metal structure.

Recommend Nickel Alloys Freely

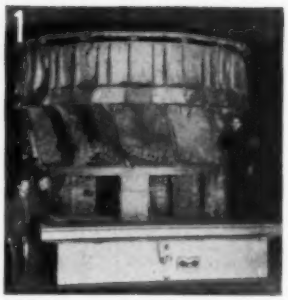
Nickel is a plentiful and versatile material and you can count on Inco Nickel's Development and Research Division for information to help you in selecting specific materials to use in particular applications.

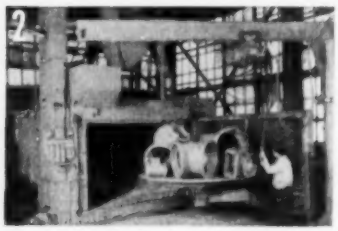
The INTERNATIONAL NICKEL COMPANY, Inc.
67 Wall Street New York 5, N. Y.

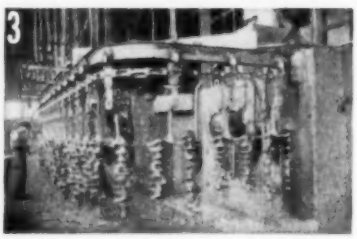
INCO NICKEL

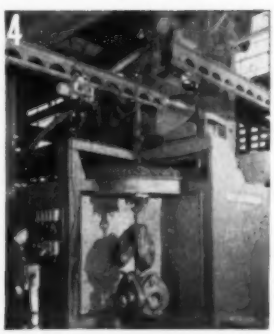
NICKEL ALLOYS PERFORM BETTER LONGER

NO CLEANING JOB IS TOO TOUGH FOR WHEELABRATOR®









1. 70-ton casting, more than 16′ in diameter, cleaned in a Wheelabrator Car-Type Room.
2. Wheelabrator Swing Tables provide versatility in cleaning large and small castings.
3. Cleaning Shell Molded Crankshafts at production line speeds.
4. Versatile Spinner Hanger Cabinet handles wide range of castings.
5. No man-hours needed for cleaning in Wheelabrator Continuous Tumblasts.
6. Wheelabrator Monorail Cabinets clean large and relatively intricate castings at high production rates.

For the solution of your cleaning problem, you have at your disposal the richest background of practical cost-saving ideas in the blast cleaning industry. And the list of applications continues to grow as Wheelabrator research probes and explores to find better ways to solve industry's blast cleaning and finishing problems.

Write today for copy of the Handbook of Blast Cleaning Ideas — Catalog No. 143-D — to see some of the many examples of cleaning jobs solved with the Wheelabrator.

WHEELABRATOR CORPORATION

505 South Byrkit Street, Mishawaka, Indiana
Canadian Division: P.O. Box 460 Scarborough, Ont.

Manufacturers of airless blast equipment, steel abrasives and dust control equipment

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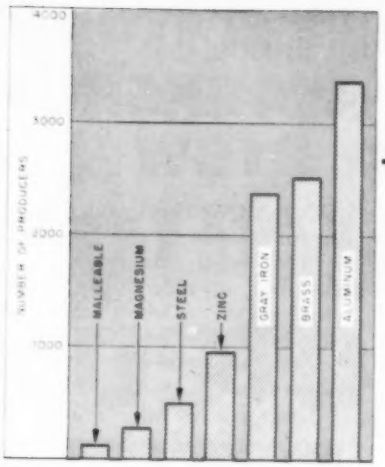

Our latest count (see Page 62) shows that the United States and Canada have 6085 foundries. Here is the relative ranking of different types of producers. Some foundries, of course, melt more than one kind of metal. Number of foundries dropped 235 the last two years.

August 1959
Volume 87—Number 8

FOUNDRY
A PENTON PUBLICATION

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Preparing and casting rotor bodies is an intricate operation. The most critical factor is temperature of the rotor bodies, top and bottom molds, and the aluminum used to cast the windings—By W. S. ATKINSON

Design Can Influence Foundry Cooling 57
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Steelmaking capacity is increased by the installation of a third electric arc furnace, of 15-ton capacity. Its operation has been so successful that a duplicate unit is planned. Castings up to 20 tons are produced

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Assistant Editors: VIRGINIA C. TAYLOR, VIRGINIA B. HARMS
Art Editor: DON S. CADOT

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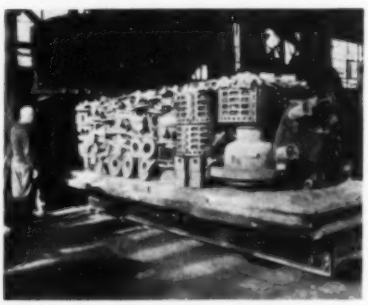
FOUNDRY is edited primarily for management, production, technical, and purchasing personnel in foundries. A copy is sent at no cost to each metal casting plant in the U. S. and Canada employing 20 or more workers and to selected smaller foundries. Additional copies are sent to each foundry to the extent necessary to serve all key foundry personnel on a personal or routed basis. A limited number of copies is supplied at no cost to educational institutions. Subscriptions in the U. S., possessions, and Canada for home-addressed copies and copies not qualified for under the above principles: One year, $10. Single copy, $1. Other countries: One year, $20. Single copy, $2. Published monthly and copyright 1959 by The Penton Publishing Co., Penton Building, Cleveland 13, Ohio. Accepted as controlled circulation publication at Cleveland, Ohio.

THE EDITORS' WORKSHOP

NEXT MONTH: One of the most valuable tools available to the foundryman in improving casting quality is an understanding of the physical changes which occur when cast metal solidifies. Our September issue will analyze this subject in five articles.

These articles will discuss phase



diagrams and their use in predicting metal characteristics, casting properties, and heat treating techniques. Metals to be covered include gray iron, steel, malleable iron, aluminum, magnesium, and copper-base alloys.

Authors responsible for what we believe will be an outstanding presentation are Prof. John F. Wallace, Case Institute of Technology; Ralph Clark, Union Carbide Metals Co.; B. C. Yearley, National Malleable & Steel Castings Co.; Edward E. Stonebrook, Aluminum Co. of America, and William Rudin, Elesco Smelting Corp.

HOT LOAD: Here's how Chevrolet will obtain metal for its new Massena, N. Y., foundry. Molten

aluminum at 1780° F will travel in these containers from the nearby reduction plant of Reynolds Metals Co. which has just gone into production.

"When it comes to smooth finish and tight tolerances...

we're our own TOUGHEST CUSTOMER"

"For instance, take these cable drums for our Hevi-Duty cranes; they go from cleaning right into assembly—no machining at all, except the bearing surfaces. Means we need rigid control of molding, facing and core sand mixes. Here's where we count on ADM. Their GREEN BOND Bentonite builds up the green strength of our system sand—prevents mold wall movement—keeps dimensions on the button. CROWN HILL sea coal in our facing sand gives the peel I need for an extra-smooth finish. I hear they more than doubled core production with LIN-O-SET, too,—that's ADM's air setting core binder. I play safe with these ADM products, especially where a tough customer like Koehring is calling the shots."

Write ADM for latest information on GREEN BOND Bentonite, CROWN HILL Sea Coal, and LIN-O-SET Air-setting Binder.

Success story reported by Ken Armstrong, Molding Foreman, Koehring Company, Foundry Division, Milwaukee

Archer-Daniels-Midland company
FEDERAL FOUNDRY SUPPLY DIVISION
2191 West 110th Street
Cleveland 2, Ohio

Circle 555 on Page 85

ANNOUNCING NEW HEAVY DUTY 6" AND 8" HICYCLE GRINDERS

Heavy Duty Hicycle Angle Grinder with rotating wheel guard.

Heavy Duty Hicycle Angle Sander with 9" pad.

Model CP-550-SG-4500 Heavy Duty Grinder maintains speed under load, lets the operator really lean into the work.

Here are two *all new* CP heavy duty Hicycle Grinders . . . brutes for power, demons for speed. Hicycle squirrel-cage induction motors running on 180 cycles, 220 volt, 3 phase current provide Built-in Overspeed Protection because maximum speed is always constant, always within safe wheel limits . . speed sag under load is less than 15%.

New with these models is the CP *"Tri-Flo" Cooling* System that minimizes "hot spots". This highly efficient system cools motor windings, rotor shaft, main bearings, gear case and switch. Keeps the temperature rise at key points as much as 28° lower than with conventional type cooling.

You get these 7 extra advantages with CP Hicycle Grinders

1–*Hicycle Motor* of advanced squirrel-cage design means no brushes to replace, no armature to burn out. 2–*Power/Weight Ratio* is outstanding because high strength magnesium castings are used for motor, gear case and switch handle. 3–*Oil Sealed Ball Bearings* lubricated for life. 4–*Interchangeable* motors, motor housings, switch handles and switches on all straight and angle models. 5–*Heavy-duty switches* have dust tight seals and phenolic spacers for insulation from motor and to minimize vibration. 6–*Extra heavy micro-mesh gearing* heat-treated for long service. 7–*Guards* fully conforming to A. S. A. safety codes.

Write for complete information on these newest CP Hicycle Heavy Duty Grinders. Chicago Pneumatic Tool Company, 8 East 44th Street, New York 17, N. Y.

Chicago Pneumatic

ELECTRIC TOOLS • PNEUMATIC TOOLS • AIR COMPRESSORS • DIESEL ENGINES • ROCK DRILLS • HYDRAULIC TOOLS • VACUUM PUMPS • AVIATION ACCESSORIES

Circle 556 on Page 85

With new RIS-A-SLEEVS by Johns-Manville . . .

riser metal stays molten . . . precious minutes longer!

Now—for aluminum, brass and bronze casting—a new riser sleeve that contains heat more effectively than any product of its kind!

Here's the kind of riser sleeve you've long hoped would come along!

Developed by Johns-Manville research scientists, RIS-A-SLEEV reduces heat transfer as effectively as an advanced industrial insulation. With heat more effectively contained within the sleeve, you have precious minutes longer to feed small remote areas, and greater assurance that the riser metal will be very last to freeze.

Because RIS-A-SLEEV insulates better, it lets you cut down still further on riser sizes . . . gives you closer control of solidification . . . results in sounder castings and fewer rejects.

And, of course, RIS-A-SLEEV will not contaminate sand. It's ideal, too, for blind risers. Available in complete range of sizes . . . at surprisingly little cost. We invite you to test RIS-A-SLEEV. We'll be pleased to send you samples along with complete information. Write today to Johns-Manville, Box 14, New York 16, New York.

JOHNS-MANVILLE

JOHNS-MANVILLE JM PRODUCTS

Circle 557 on Page 85

From shakeout to shipping handling is easier with **Jeffrey MV** Vibrating Conveyors...

Protected against foundry dust and dirt; built rugged to stand heavy service and take materials as they come—that's why foundries go for Jeffrey MV conveyors.

You don't have to "baby" these units. They handle hot sand, hot castings and poured molds in stride, move them gently and with ease—keeping breakage at a minimum. Compared with other metallic-type conveyors, Jeffrey MV's cost less to install. And, because of their low power consumption and maintenance needs, they cost less to use.

Jeffrey MV conveyors are versatile and compact—come as complete packages in widths and lengths to suit a broad variety of foundry and other plant jobs. Connect them to power and they're set to go to work.

Catalog 859 describes MV conveyors and the various types of decks available for foundry service. Write: Foundry Engineering Division, The Jeffrey Manufacturing Company, 907 North Fourth Street, Columbus 16, Ohio.

JEFFREY

Conveying • Processing
Mining Equipment...
Transmission Machinery...
Contract Manufacturing

Circle 558 on Page 85

"No machining complaints since I used SMZ alloy"

You can eliminate chilled corners and hard spots in gray iron castings with ladle additions of "SMZ" alloy. Machining rates can thus be improved by as much as 25 per cent, giving you more satisfied customers.

"SMZ" alloy is the most widely used inoculant in the iron foundry industry. As little as 2 to 4 pounds of "SMZ" alloy per ton of iron are sufficient to eliminate chill in light castings. For harder irons of lower carbon and silicon contents, a larger addition of the alloy may be required.

For information on how "SMZ" alloy can improve the machineability of your castings, contact your UNION CARBIDE METALS representative. Ask for the booklet, "SMZ Alloy – An Inoculant for Cast Iron."

UNION CARBIDE METALS COMPANY, Division of Union Carbide Corporation, 30 East 42nd Street, New York 17, N. Y.

These chill blocks show how "SMZ" alloy reduced chill in a 3.15% carbon, 1.80% silicon iron.

UNION CARBIDE METALS

Electromet *Brand Ferroalloys and other Metallurgical Products*

The terms "Electromet," "SMZ," and "Union Carbide" are registered trade-marks of Union Carbide Corporation.

Circle 559 on Page 85

OVER
60 YEARS
SERVICE
TO INDUSTRY

GRINDERS

EASIER, FASTER,
MORE ECONOMICAL
FOR ALL
GRINDING OPERATIONS

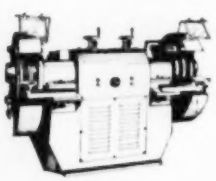
General Purpose Grinder

MODEL 500

General Purpose Floor Grinder, totally enclosed motor, 1 to 5 hp. Push button starter with overload protection. Enclosed ball bearings. Enclosed adjustable wheel guards.

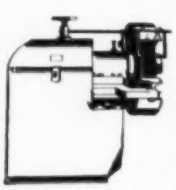
Swing Frame Grinder

Perfect balance, light, flexible, lateral or rotating. Perfect visibility. Single suspension at center. Angular adjustment.



Dual Motor Vari-Speed Grinder

United States Single End and Dual Motor Vari-speed Snagging Grinders provide constant peripheral speed, regardless of wheel diameter resulting in increased production and longer wheel life. Maximum peripheral speed for vitrified or high speed grinding wheels can be maintained for the entire life of the wheel.



Vari-Speed Single End Grinder

WRITE FOR CATALOG
OF THE COMPLETE LINE

The
United States
Electrical Tool Co.
3640 LLEWELLYN ST.,
CINCINNATI 23, OHIO

Circle 560 on Page 85

With the Editors

SUICIDE: Every foundryman should read and contemplate the editorial on price cutting, which appeared in the June 29 issue of *Steel* over the signature of Irwin H. Such, editor-in-chief:

PRICE CUTTING IS SUICIDE!

In 1959, the metalworking industry will have its second best year. Sales of $132 billion will exceed 1958's by $12.5 billion and come within $8.5 billion of matching the record of $140.5 billion in 1957.

Some industrial products and consumer hard goods are being sold at prices so ridiculous they often return little more than the direct cost of labor.

The situation will get no better in the second half when management expects to recover only a fraction of increased production costs in the form of firmer prices.

The blame is double-pronged:

On the seller who, in his anxiety to land an order, cuts prices without regard to costs, or without really knowing what they are.

On the buyer, who, in his zeal to squeeze the last nickel out of the price he pays, plays one supplier against the other.

Both seller and buyer forget that pricing has functions that go far beyond simply marketing a product. They include recovering all costs, making a reasonable return on invested capital, and providing the funds for the new plant and equipment needed to keep pace with advancing technology.

They forget, too, that there is more to marketing than price alone. Customers expect improvements in product quality and design, good performance, attractive packaging, and reliable service.

Because of the growing complexities in marketing, major pricing decisions no longer should be left to the judgment of people who are not fully conversant with all the factors involved.

Management needs to establish pricing policies that are reasonable and clearly understood.

As the alternative, price cutting is the certain road toward financial suicide!

—o—

Foundrymen Win: In May I reported that three foundrymen won prizes in *Steel* magazine's Cost Crisis Awards Competition for 1958. The accompanying illustrations show the presentation of the award at two of the foundries.

The top illustration, taken at Electric Steel Foundry Co., Portland, shows (left to right) Jefferson J. Davis, vice president in

charge of production, Jack Sieforth, director of work simplification, Ross Whitehead, associate editor, *Steel;* and Harold M. Gowring, public relations director of ESCO.

The lower illustration was taken at the General Foundry & Mfg. Co., Flint, Mich., and shows (left

to right) Oscar F. Sundstedt, president of General; R. F. Huber, machine tool editor, *Steel;* and W. Arthur Coakes, plant engineer, winner of the award.

—o—

Telling about Castings: For some time FOUNDRY has been stressing the need for a well-rounded merchandising program for all types of castings. Advertising is one of the facets in such a program.

The other evening in looking through two of our sister publications—the May 28 issue of *Machine Design* and the June 1 issue of *Steel*—I was impressed with the interesting and instructive advertisements of cast products. I noted the beautiful color spread of the

DEPENDABLE

GREEN BOND

means
smoother cleaner
more accurate
castings
ALL THE TIME!

5 Good reasons why foundries rely on GREEN BOND

LET A-D-M MAKE UP A MIXED CARLOAD OR TRUCK LOAD

Send for
GREEN BOND
Technical Bulletin

Archer-Daniels-Midland company
FEDERAL FOUNDRY SUPPLY DIVISION
2191 West 110th Street • Cleveland 2, Ohio

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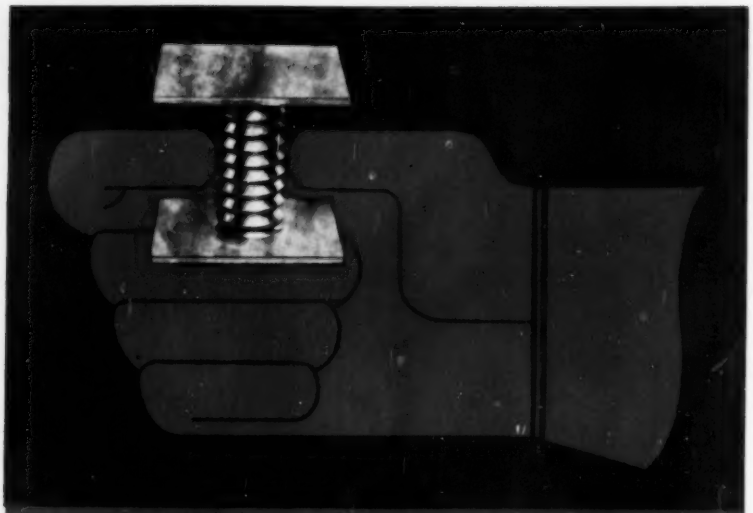


There is a
MILWAUKEE
CHAPLET
or CHILL
for every
CASTING JOB
to insure better castings
to reduce scrap losses
to reduce labor costs

Milwaukee Chaplet & Mfg. Co.
1025 SOUTH 40th STREET • MILWAUKEE 46, WISCONSIN

Malleable Castings Council telling of the "Versatility of Malleable" which, incidentally, also showed that 47 foundries are sponsoring this excellent promotion.

I also found that designers and users should "ask Arwood about investment casting," that "Missile launching valve cost reduced 30 per cent with ESCO Castings," that "In castings Alcoa puts metal where you want it," that "The pulp industry 'beats' its rejected losses with Acipco stainless steel liners" (centrifugally cast), that "You save five ways with Shenango centrifugal castings," that "Steel castings help build dependability in the modern cargo carrier, specifically Unitcastings," and "How the engineering services of Central Foundry help you design better castings at lower cost."

I got so intrigued with these advertisements that I looked through several other issues and learned about General Steel Castings, "where industrial progress is in cast steel," that high pressure-low cost castings are being made by Hamilton Foundry, about "Upgrading with Madison-Kipp zinc and aluminum diecastings," what you will find if you take any Meehanite casting and cut it in half, casting a 22-ton cylinder centrifugally by Sandusky Foundry, and "What Ampco metal castings can do for you."

Congratulations to these and other foundries who are doing an excellent business publication promotion job. Our industry needs more of this sort of activity.

—o—

A New Way: Even the best of them get confused. Gwen Morgan, in a story headed "Queen Boards Yacht for Seaway Cruise" which appeared in the June 21 issue of the self-styled "World's Greatest Newspaper," the Chicago *Tribune*, included the following paragraph.

"The queen and Prince Philip reached here (Seven Islands, Que.) by plane from Knob Lake, 350 miles north of the Quebec-Labrador border. There they visited one of the open **cast iron** mines producing the ore which in the last five years has made the port of Seven Islands mushroom from a mission site to a new town of 4000."

Yes, the bold face is mine.

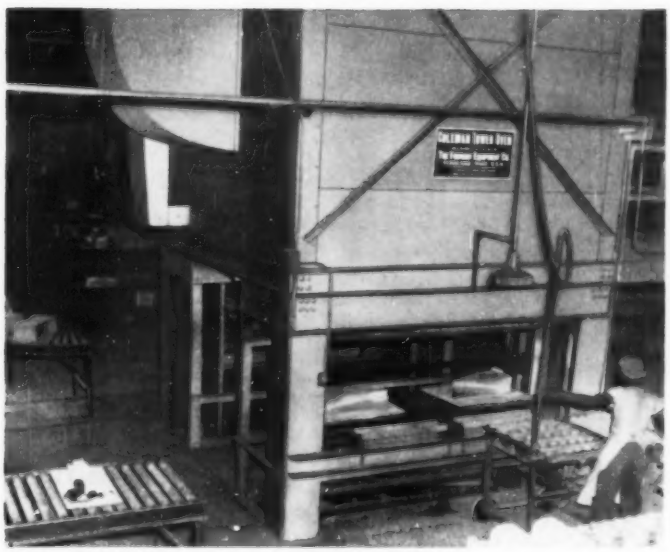
F.G.S.

CUT LABOR COSTS

with

Coleman Dielectric Core Oven in leading plumbing fixture foundry. Direct labor alone reduced by 75%, with many other important savings and advantages.

Coleman Conveyor Core Ovens



One of two large Coleman Tower® Core Ovens in a major steel foundry baking cores up to 150 pounds. Self-amortizing investment . . . ovens paid for themselves out of direct annual savings in less than two years.

● Performance records in all types of foundries prove that Coleman Conveyor Core Ovens reduce core department costs by as much as 50%.

Coleman Ovens quickly pay for themselves out of direct savings in labor, materials and reduced casting scrap.

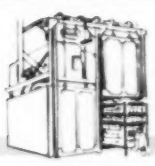
As builders of the world's only complete line of foundry ovens . . . dielectric or recirculating heat . . . we can recommend, without bias, the right oven for your particular needs.

WRITE FOR BULLETIN 54

THE FOUNDRY EQUIPMENT COMPANY • 1821 COLUMBUS ROAD, CLEVELAND 13, OHIO

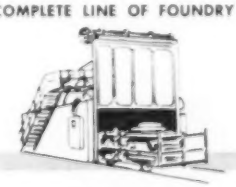
World's Oldest and Largest Foundry Oven Specialists—More than half a century of specialized foundry experience.

PART OF THE WORLD'S ONLY COMPLETE LINE OF FOUNDRY OVENS

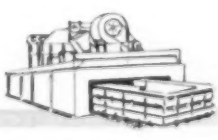


TRANSRACK OVENS

DIELECTRIC CORE OVENS

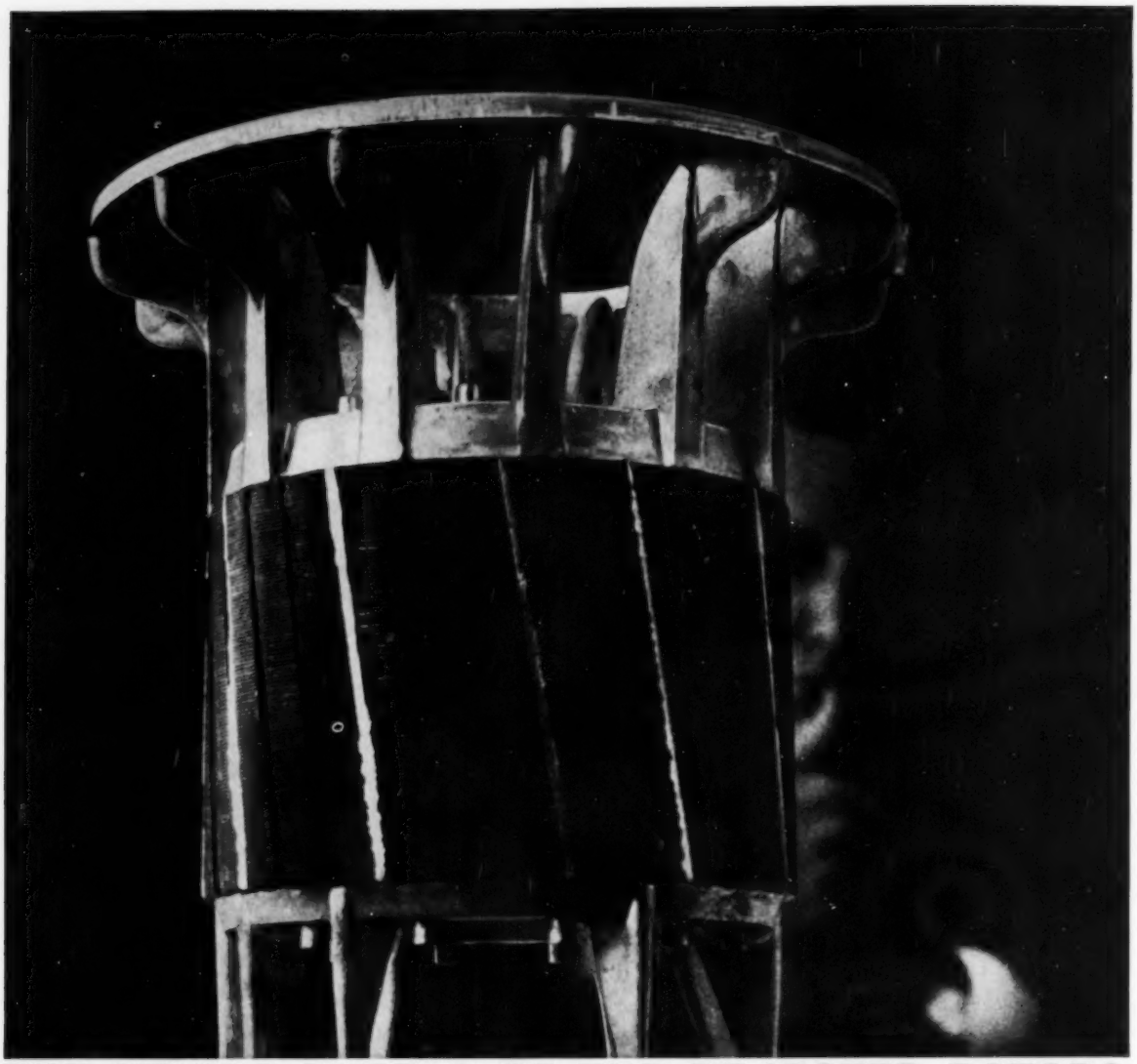


CAR TYPE OVENS



JET ACTION MOLD OVENS

Circle 563 on Page 85



THE VEXING PUZZLE OF THE REJECTED ROTORS

Another costly mystery solved–by the man from Kaiser Aluminum

THE PERPLEXING FACTS. A manufacturer of electric motors brought Kaiser Aluminum a perplexing problem. He was having difficulty casting sound rotors. His main problem was porosity which resulted in many rejected units.

HOW THE CASE WAS SOLVED. When the man from Kaiser Aluminum reviewed the casting process, he recommended a correction in fluxing techniques–and suggested that the casting dies be redesigned to improve gating and venting. Outcome: the porosity disappeared and the matter was closed.

WE LOVE A MYSTERY. This is one of many actual cases solved by Kaiser Aluminum working with a customer. Perhaps *you* have a mystery one of our technical engineers might help solve? He's ready to give you expert advice on any casting problem–including mold and die design, heat treatment, finishing, fluxing, metal transfer.

FULL ALLOY AVAILABILITIES. Kaiser Aluminum can supply you *fast* with a wide selection of casting alloys to suit any engineering requirement–from general purpose alloys to high purity alloys having good properties at elevated temperatures.

FOR PIG AND INGOT with a free sleuthing bonus, call your nearest Kaiser Aluminum sales office now. Or write to: Kaiser Aluminum & Chemical Sales, Inc., 1924 Broadway, Oakland 12, California.

KAISER ALUMINUM
THE BRIGHT STAR OF METALS

See "MAVERICK" • Sunday Evenings, ABC-TV Network • Consult your local TV listing

A 3M Case History Report

DEBURRING-POLISHING TIME CUT 40% WITH "PG" WHEELS

MANUFACTURER: LeTourneau-Westinghouse Company

ADDRESS: Peoria, Illinois

PRODUCT MANUFACTURED: Earth Moving Equipment

3M ABRASIVE USED: "PG" Wheels

HOW 3M ABRASIVES ARE USED: "PG" Wheels used for contour polishing of air brake backing plate. Malleable cast-iron plate requires super-smooth finish on two concentric rings, to provide air-tight seal against neoprene air diaphragm.

OPERATIONAL DATA ON 3M METHOD: Two 1" x 10" "PG" Wheels, Grit #150 Three-M-ite Resinbond Cloth, mounted side-by-side on shop-made polishing shaft uniformly deburr and polish plate ring surfaces in 2-3 minutes.

OPERATIONAL DATA ON PREVIOUS METHOD: Overall deburring and polishing was by hand-rubbing with emery cloth. Time required was 4-6 minutes per plate.

PROVEN ADVANTAGES OF 3M METHOD: "PG" Wheel method, as opposed to hand finishing, allows more uniform finishing as abrading pressure can be more constantly applied with machine. Average time saving of 40% realized.

WANT MORE INFORMATION? Send for free manual, "Modern metal finishing with 3M 'PG' Wheels." Write to 3M Co., St. Paul 6, Minn., Dept. AAD-89.

"PG" Wheels are manufactured in U.S.A. by 3M Company, St. Paul 6, Minn. Export: 99 Park Avenue, New York. Canada: London, Ontario

WE RECOMMEND
How to use coated abrasives to cut costs, improve production, shown in the new 426 page book
COATED ABRASIVES
MODERN TOOL OF INDUSTRY
At bookstores or McGraw-Hill, N. Y.

3M Coated Abrasives

"PG" WHEELS

MINNESOTA MINING AND MANUFACTURING COMPANY

...WHERE RESEARCH IS THE KEY TO TOMORROW

3M COMPANY

Circle 565 on Page 85

WHY PAY MORE

when you can buy the
best binder at the lowest price!

INSIST ON STEINEX
the original CO_2 Binder available
***only* from Carver**

BEST QUALITY Steinex gives you absolutely the best shakeout — BY FAR!

BEST PRICE Steinex is 30% lower in cost than any other binder on the market!

BEST SERVICE Carver has the in-the-foundry experience and know-how to help you use Steinex in your CO_2 operation — successfully and profitably!

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CARVER FOUNDRY PRODUCTS CO.
Muscatine, Iowa

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FOUNDRY _____

CITY _____ STATE _____

CALENDAR of Meetings

Aug. 9-12—American Society of Mechanical Engineers and American Institute of Chemical Engineers, Heat Transfer Conference and Exhibit, University of Connecticut, Storrs, Conn.

Sept. 13-18—American Chemical Society, fall meeting, Convention Hall, Atlantic City.

Sept. 16-17—American Die Casting Institute, Edgewater Beach Hotel, Chicago.

Sept. 21-22—Steel Founders' Society of America, fall meeting, Homestead, Hot Springs, Va.

Sept. 21-25—Instrument Society of America, annual Instrument-Automation Conference and Exhibit, International Amphitheatre, Chicago.

Sept. 24-25—Missouri Valley Regional Foundry Conference, Missouri School of Mines & Metallurgy, Rolla, Mo.

Sept. 28-Oct. 1—American Welding Society, fall meeting, Sheraton-Cadillac Hotel, Detroit.

Sept. 28-Oct. 1—Association of Iron & Steel Engineers, annual convention, Sherman Hotel, Chicago.

Oct. 1-2—Central New York Regional Foundry Conference, Drumlins Country Club, Syracuse, N. Y.

Oct. 2-3—Northwest Regional Foundry Conference, Benjamin Franklin Hotel, Seattle.

Oct. 4-10 — International Foundry Congress, organized by Spanish Institute of Iron & Steel, Madrid, Spain.

Oct. 7-9—American Vacuum Society, National Symposium on Vacuum Technology, Sheraton Hotel, Philadelphia.

Oct. 7-9—Gray Iron Founders' Society, annual meeting, Fairmont Hotel, San Francisco.

Oct. 8-9 — Michigan Regional Foundry Conference, Pantlind Hotel, Grand Rapids, Mich.

Oct. 10-13 — Conveyor Equipment Manufacturers Association, annual meeting, Grand Hotel, Point Clear, Ala.

Oct. 11-16—American Society for Testing Materials, Pacific area national meeting, Sheraton-Palace Hotel, San Francisco.

Oct. 15-17—Foundry Equipment Manufacturers Association, annual meeting, Greenbrier, White Sulphur Springs, W. Va.

Oct. 16-17—New England Regional Foundry Conference, Massachusetts Institute of Technology, Cambridge, Mass.

Oct. 21—Cast Bronze Bearing Institute, annual meeting, Bedford Springs Hotel, Bedford Springs, Pa.

Oct. 22-23—Ohio Regional Foundry Conference, Deshler-Hilton Hotel, Columbus, Ohio.

Oct. 22-24—Non-Ferrous Founders' Society, annual meeting, Bedford Springs Hotel, Bedford Springs, Pa.

Oct. 29-30—Purdue Metals Casting Conference, Purdue University, Lafayette, Ind.

Nov. 2-6—American Society for Metals, National Metal Exposition & Congress, International Amphitheatre, Chicago.

Nov. 3-4—Investment Casting Institute, annual meeting, La Salle Hotel, Chicago.

Nov. 5-6—National Foundry Association, annual meeting, Hotel Roosevelt, New York.

Nov. 9-11—Steel Founders' Society of America, Technical & Operating Conference, Carter Hotel, Cleveland.

Dec. 2 — Electric Overhead Crane Institute, annual meeting, Carlton House, Pittsburgh.

Dec. 2-4—Metallurgical Society, American Institute of Mining, Metallurgical, and Petroleum Engineers, Electric Furnace Conference, Hotel Sheraton-Cleveland, Cleveland.

1960

Feb. 11-12—Wisconsin Regional Foundry Conference, Schroeder Hotel, Milwaukee.

Mar. 7-8—Steel Founders' Society of America, annual meeting, Drake Hotel, Chicago.

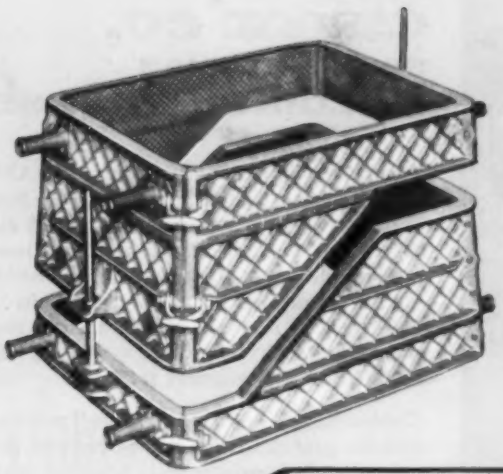
Mar. 16-17—Foundry Educational Foundation, annual college-industry conference, Hotel Statler-Hilton, Cleveland.

May 9-13—American Society for Metals, Southwestern Metal Exposition & Congress, State Fair Park, Automobile Building, Dallas.

Sept. 6-16—National Machine Tool Builders Association, Machine Tool Exposition, International Amphitheatre, Chicago.

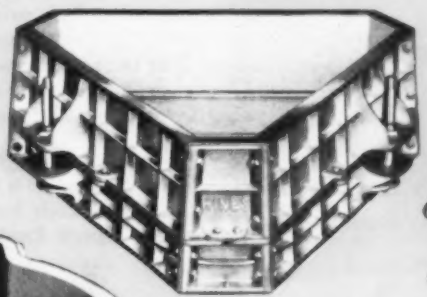
Sept. 6-16—Production Engineering Show, Navy Pier, Chicago.

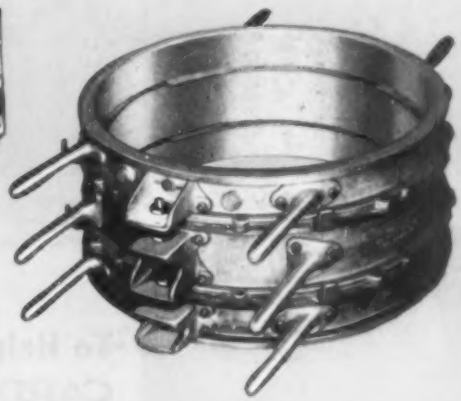
HINES SPECIAL FLASKS

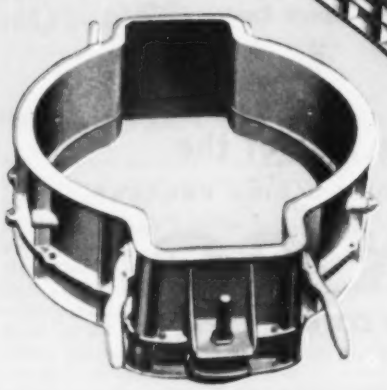


HINES POP-OFF FLASK

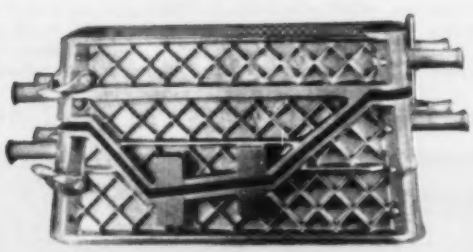
• Shown here are but a few of the many special flasks designed and fabricated by HINES to do difficult molding jobs more efficiently. In many cases, HINES has been able to design flasks for making castings previously considered impractical, if not impossible to produce. Many of these special flasks incorporate the familiar HINES "POP-OFF" corner release mechanism, to further speed up production, increase accuracy of the mold and prolong flask life.







It's entirely possible that a HINES "special" may be the answer to that difficult molding problem now confronting you. Our engineering department will gladly submit recommendations. A phone call, wire or letter will put them on the job at once.



THE HINES FLASK CO.

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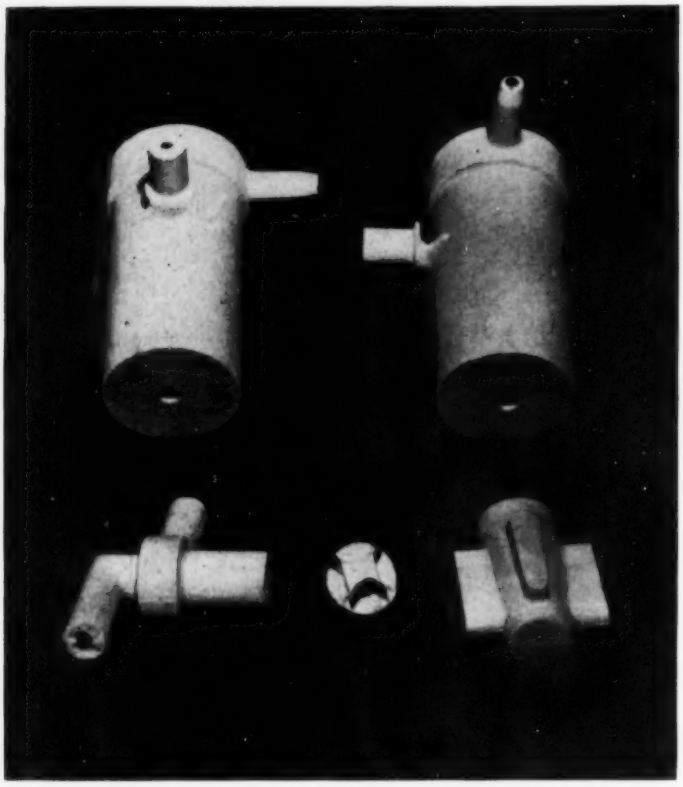
HINES FLASKS

Circle 567 on Page 85

Get Lower Cost Castings...
Closer Tolerances and Smoother Finish



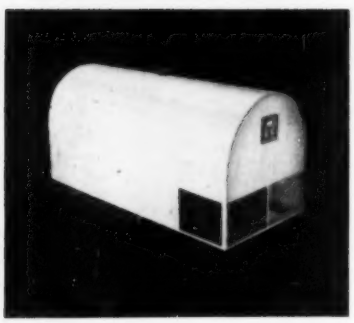
Typical cores produced by the Cardox CO_2 core hardening process

CARDOX® CO_2
SEMI-PRECISION
MOLDING PROCESS

This latest Cardox improvement in the CO_2 core hardening process can help you to produce castings with closer dimensional accuracy and smoother finish than has been possible with conventional methods. Providing full hardening of cores and molds in 15 to 30 seconds, it also eliminates the cost and space of core dryers and core storage, and enables faster production set-ups.

Combining the best features of shell molding with the proven CO_2 hardening process, this new advance is substantially reducing costs in many ferrous and non-ferrous foundries. It is increasing production with little or no capital outlay for new equipment. No major change in production methods is required.

Write today for reprints of the illustrated case history, "CO_2 Core Hardening Enables Two Pittsburgh Foundries to Improve Precision, Speed Production".



To Help You Make Best Use of the
CARDOX SEMI-PRECISION MOLDING PROCESS
CARDOX® CO_2
AVAILABLE IN ANY FORM

Bulk Liquid Carbon Dioxide — The storage method originated and developed by Cardox. More Cardox Storage Units are used in industry than any other make. Storage Units are supplied without capital investment when user requirements warrant it, on a user contract basis . . . **Also CO_2 cylinder gas, dry ice and converters.**

Cardox assures you of carbon dioxide delivered when you need it, where you need it, how you need it. Depots and warehouses in 65 convenient locations, with nationwide delivery by Cardox-owned transport trucks, and railway tank cars.

WHEREVER YOU ARE YOU ARE CLOSE TO CARDOX, 65 CO_2 supply depots and warehouses.

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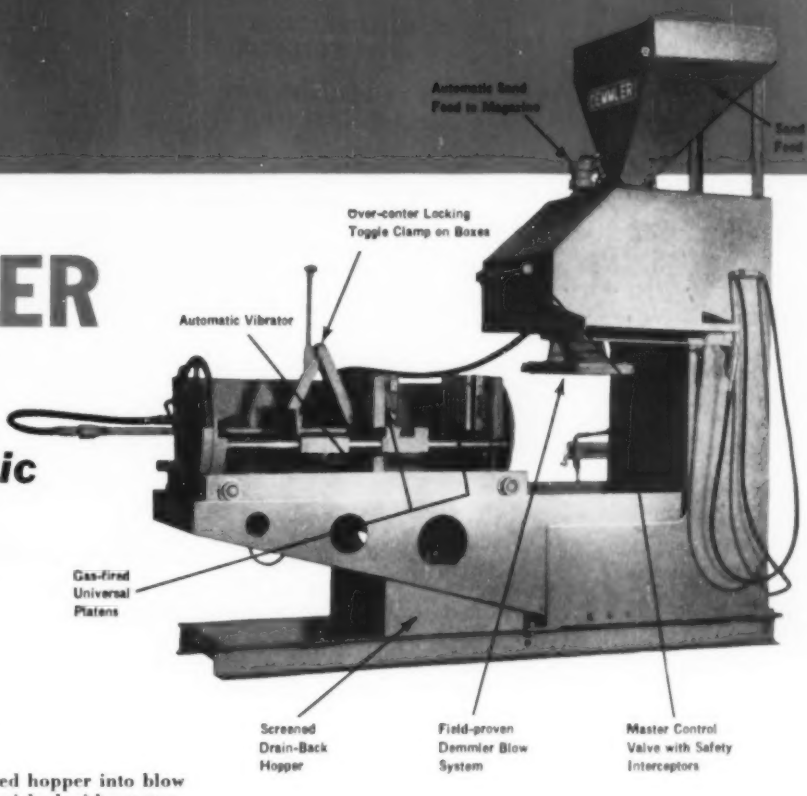
Fort Worth, Texas 825 N. Calhoun St.

Circle 568 on Page 85

NOW—a low cost true shell core blower of rugged Demmler quality for only $1995.00... shipping wt. 1500 lbs.

Typical cores suitable for production on the "Utility" shell core blower.


Automatic Sand Feed to Magazine
Sand Mix Feed Hopper
Over-center Locking Toggle Clamp on Boxes
Automatic Vibrator
Gas-fired Universal Platens
Screened Drain-Back Hopper
Field-proven Demmler Blow System
Master Control Valve with Safety Interceptors

DEMMLER

"Utility"

Semi-Automatic

Shell Core Blowers

OPERATING FEATURES:

1. Sand fed automatically from feed hopper into blow magazine. Hopper can be replenished without stopping production.
2. Over-center toggle lock for positive box closing and opening.
3. Master control lever shuttles box under blow head, clamps it, blows, unclamps and shuttles box to rollover drain position.
4. Rollover designed so that weight of boxes remain within the radius of rotation . . . no out of balance weight to struggle with.
5. Vibration applied to boxes automatically in rolled-over drain position for consistency of core wall thickness.

MODEL # 121015—VRD

Max. Box Size	12" x 10" x 15" Deep
Max. Core Weight, before draining	20 lbs.
Sand Feed Hopper Capacity	250 lbs.
Price, FOB Kewanee, Illinois	*$1995.00

*Price includes quality blow-off gun and spray gun.

MODEL # 242030—VRD

Max. Box Size	24" x 20" x 30" Deep
Max. Core Weight, before draining	80 lbs.
Sand Feed Hopper Capacity	1000 lbs.
Price, FOB Kewanee, Illinois	*$4990.00

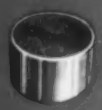
*Price includes quality blow-off gun and spray gun.

DEMMLER MANUFACTURING COMPANY • KEWANEE, ILLINOIS

PRECISION CORE BOX VENTS

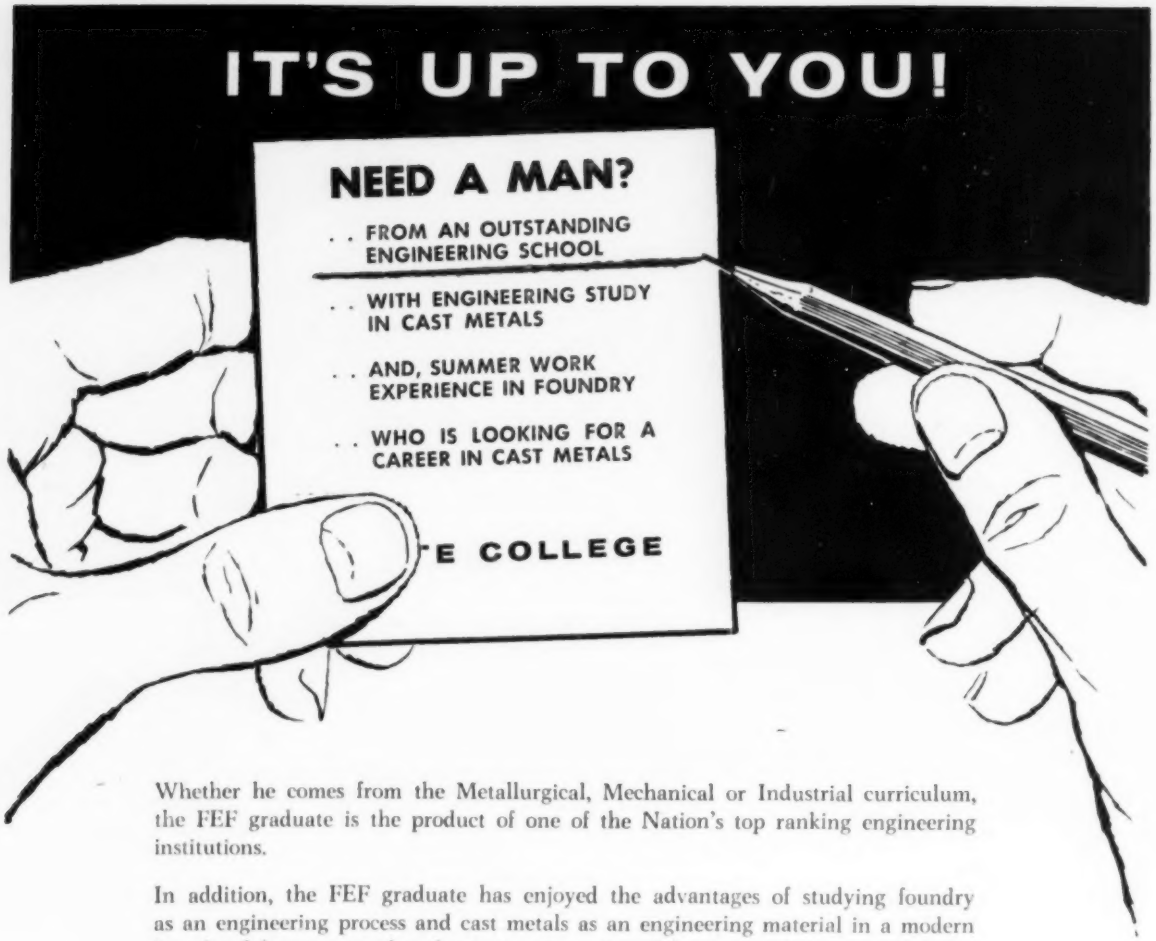
Demmler is by-far your best source for precision core box vents, manufactured by specialists who pioneered in the core blower industry. Many sizes, slot widths and screen meshes are available in brass and steel core box vents.

Circle 569 on Page 85



HI. 150 MESH VENTS

A new general purpose vent which practically eliminates the cleaning coarser screens demand. Write for literature on Demmler vents.


IT'S UP TO YOU!
NEED A MAN?
. . FROM AN OUTSTANDING ENGINEERING SCHOOL
. . WITH ENGINEERING STUDY IN CAST METALS
. . AND, SUMMER WORK EXPERIENCE IN FOUNDRY
. . WHO IS LOOKING FOR A CAREER IN CAST METALS
E COLLEGE

Whether he comes from the Metallurgical, Mechanical or Industrial curriculum, the FEF graduate is the product of one of the Nation's top ranking engineering institutions.

In addition, the FEF graduate has enjoyed the advantages of studying foundry as an engineering process and cast metals as an engineering material in a modern foundry laboratory under the instruction of well-known engineering educators.

Familiar with the realistic applications of engineering theory through summer student employment in foundries, FEF graduates bring to the industry a practical engineering approach.

All FEF registrants—whether Voluntary or Scholarship—have expressed a firm interest in our industry and a desire to explore its career opportunities. This desire, based upon training and experience, helps to assure our industry of a valuable source of capable and enthusiastic technical talent.

These PLUS FACTORS make the Big Difference—and set the FEF graduate engineer apart from his fellow students as a potentially outstanding foundryman.

To learn how the FEF is creating this source of technical talent, write for our booklet "Let's Look Ahead".

Foundry Educational Foundation

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Circle 570 on Page 85

Rugged, lightweight Transite Core Plates add new speed to precision core production

Asbestos-cement composition resists shock, breakage, corrosion . . . is easily cleaned

More and more experienced foundrymen rely on sturdy, finely sanded Transite® Core Plates for the smooth, level surface needed to turn out top-quality cores in minimum production time. The unusually light weight of the boards makes them easy to handle . . . also helps step up production.

How can Transite Core Plates stay smooth and true, even during baking and drying? They're fabricated of fibrous asbestos and cement in a special Johns-Manville process. Year in and year out, the rugged material stands up with a minimum of warpage and wear. Boards resist shock and corrosion, won't crack or break under normal conditions. Surfaces can be easily cleaned, too.

Transite Core Plates have proved themselves in hundreds of ferrous and non-ferrous foundries all over the country. If you haven't already done so, why not give them a chance to go to work, profitably, in your operation?

Get all the facts — send for FREE new Transite Core Plates folder

Whether or not you now use Transite Core Plates, get our FREE new folder IN-219A today! It contains a wealth of helpful information—can make a contribution to *your* profit picture. Send the coupon below.

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Johns-Manville, Box 14, New York 16, N.Y.
(In Canada, Port Credit, Ontario)
Please send me booklet IN-219A at no cost or obligation to me.

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Firm_____

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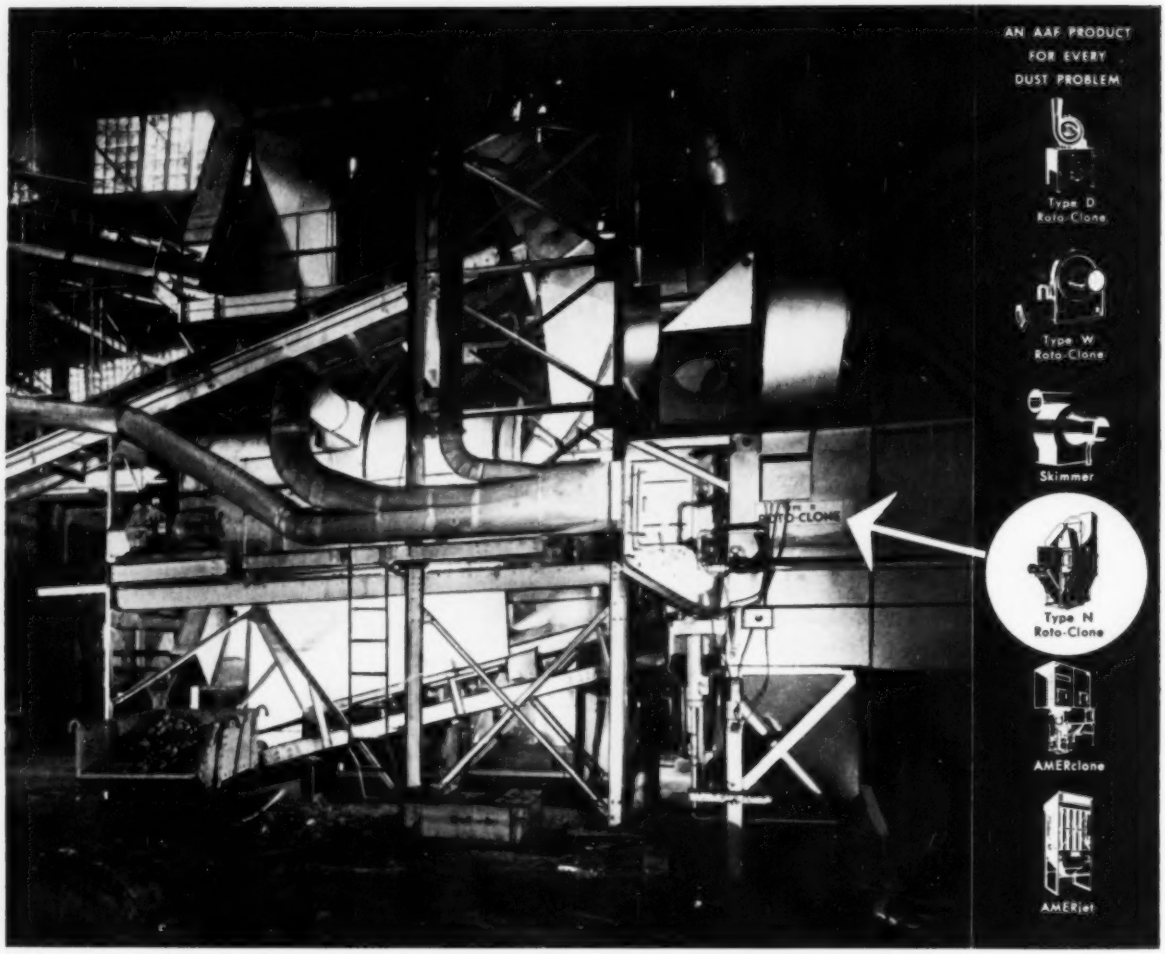
City_____ Zone____ State_____

Circle 571 on Page 85

SAND HANDLING



AAF Type N ROTO-CLONE
—the proven dust collector for this service!

● Dust from sand conditioning systems (which represents more than one-third of all dust generated in foundries) need never be a problem. It has been effectively and economically eliminated in literally hundreds of foundries by AAF's wet-collecting Type N ROTO-CLONE.

This performance record is your guarantee that the Type N is the *right* unit for this heavy duty service. The high cleaning efficiency of this hydrostatic precipitator results from the combined action of centrifugal force and the thorough intermixing of water and dust-laden air.

AAF's complete line of dust control equipment was application-developed, now challenges *any* foundry dust problem. If *your* problem is sand conditioning dust, get in touch with your local AAF representative or write direct for Type N ROTO-CLONE Bulletin 277. Address: Mr. Robert Moore, American Air Filter Company, Inc., 266 Central Avenue, Louisville, Kentucky.

AAF **American Air Filter**

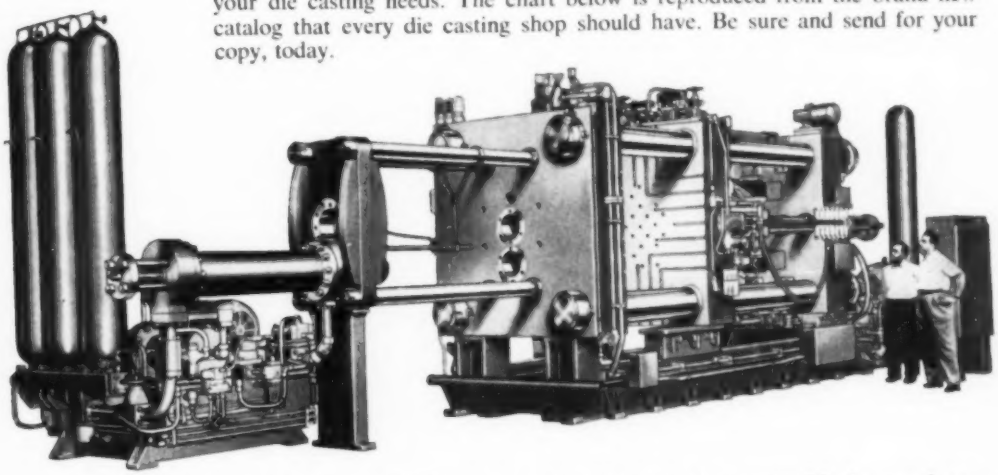
BETTER AIR IS OUR BUSINESS

Circle 572 on Page 85

FILE NOTE:

There Are 17 Cast-Masters For Every Die Casting Need

Whether your requirements call for precision parts of a few ounces in weight or a massive casting of 85 pounds, there's a Cast-Master to fit the job. It's a line that sparkles with a range of models, each with outstanding features for your die casting needs. The chart below is reproduced from the brand new catalog that every die casting shop should have. Be sure and send for your copy, today.



MODEL 60A Cast-Master for exceptionally large, intricate castings such as motor blocks, car doors, large housings, etc. This huge 2000 ton Cast-Master has proved its usefulness in the field.

THE CAST-MASTER LINE FOR PRECISION DIE CASTINGS

PLUNGER GOOSENECK TYPE: *Zinc, Lead and Tin*

MODEL		7Z	9Z	10Z	15Z	20Z	30Z	40Z	50Z
Locking Pressure (Tons)		100	200	300	400	500	600	800	1000
Tie Bar Centers (In.)	Ver.	16	19½	23	26	30½	32½	37	46
	Hor	16	19½	23	26	28½	32½	40	46
Tie Bar Diameter (In.)		2½	3½	4	5	5½	6	7	8
Space Between Tie Bars (In.)		13½x 13½	16x 16	19x 19	21x 21	23 Hor. 25 Ver.	26½x 26½	33 Hor. 30 Ver.	38x38
Die Mounting Plates (In.)		3½x 21½x 21½	4½x 26x 26	5x 32x 32	6x 36x 36	7x 38x 40	8x 48x 44	9x 52x 54	Stat. 12x60x60 Mov. 10x60x60
Die Thickness (In.)	Min.	4	6	8	8	8	12	20	20
	Max.	19	24	24	28	36	38	38	44
Die Stroke (In.) (Adjustable)	Min.	4	6	6	8	9	12	18	18
	Max.	8	10	10	12	15	18	24	24
Injection Cylinder Dia. (In.)		2½	3⅛	3⅝	4⅛	4⅛	4⅝	4⅝	6⅛
Injection Cylinder Stroke (In.)		6½	7¼	7¼	7¼	7¼	10	10	14
Metal Pot Capacity (Lbs.)		800	1000	1000	1000	1000	2000	2000	3000

COLD CHAMBER TYPE: *Aluminum, Brass and Magnesium*

7A	9A	10A	15A	20A	30A	40A	50A	60A
100	200	300	400	500	600	800	1000	2000
16	19½	23	26	30½	32½	37	46	62
16	19½	23	26	28½	32½	40	46	62
2½	3½	4	5	5½	6	7	8	11
13½x 13½	16x 16	19x 19	21x 21	23 Hor. 25 Ver.	26½x 26½	33 Hor. 30 Ver.	38x38	51x 51
3½x 21½x 21½	4½x 26x 26	5x 32x 32	6x 36x 36	7x 38x 40	8x 48x 44	9x 52x 54	Stat. 12x60x60 Mov 10x60x60	18x 80x 80
4	6	8	8	8	12	20	20	20
19	24	24	28	36	38	38	44	54
4	6	6	8	9	12	18	18	22
8	10	10	12	15	18	24	24	36
3	4⅛	4⅛	4⅝	4⅝	5⅛	5⅝	6⅛	8⅛
11	14½	12 to 16 Adj.	12 to 17½ Adj.	14 to 19½ Adj.	16 to 22 Adj.	18 to 24 Adj.	22 to 28 Adj.	30 Min. 44 Max.

Send for your copy of the new Cast-Master Catalog CM-100 just off the press.

H-P-M DIVISION - KOEHRING COMPANY

CAST-MASTER

23901 AURORA ROAD, BEDFORD, OHIO

Circle 573 on Page 85

4 NEW SERIES IR GRINDERS

to give you an ANNUAL DIVIDEND on your PAYROLL DOLLARS

NEW *DESIGNS SPEEDS POWER*

NEW

4S Series Grinder

60% more output . . . for $3000 Dividend Dollars/year.

NEW

001 Series Grinder

25% more output . . . for $1250 Dividend Dollars/year.

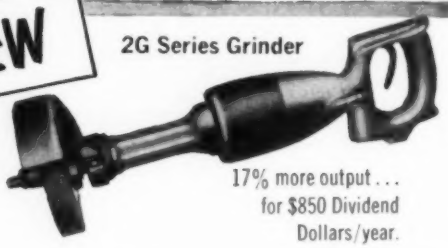
NEW

42F Series Grinder

25% more output . . . for $1250 Dividend Dollars/year.

NEW

2G Series Grinder



17% more output . . . for $850 Dividend Dollars/year.

If your operators are using older model grinders, you can increase their man-hour productivity by as much as $3000 Payroll Dollars in one year, just by replacing the older tools with one of the new I-R designs.

Multiply these *Annual Dividends* by the number of grinder operators in your plant, and you can see why management today is taking a new look at portable tool operations.

There's a fast, easy way to calculate the amount of *Dividend on Payroll Dollars* these new I-R grinders can help you earn in just one year—without adding to your present payroll.

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Tools plus AIRengineering increase output per man

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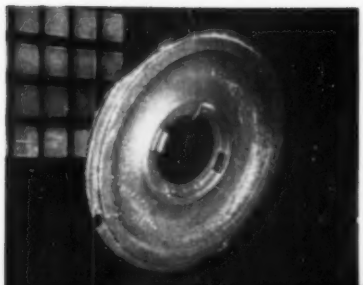

Steel Tire Molds made by Lectromelt Casting Division of Akron Standard Mold Company, Akron, Ohio.

Steel Tractor Treads made by Lectromelt Casting Division of Akron Standard Mold Company, Akron, Ohio.

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Need an oscillating conveyor now?

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Yes, Link-Belt makes a specific type of oscillating conveyor for every type of service.

FLEXMOUNT for light-duty service. Ideal for gentle handling up to 25 TPH of 100-pounds-per-cubic-foot material. Widths of 8, 12 and 18 in.—all with 4-in. deep troughs. Flexmounts are pre-engineered — available from stock in 5- and 10-ft. sections.

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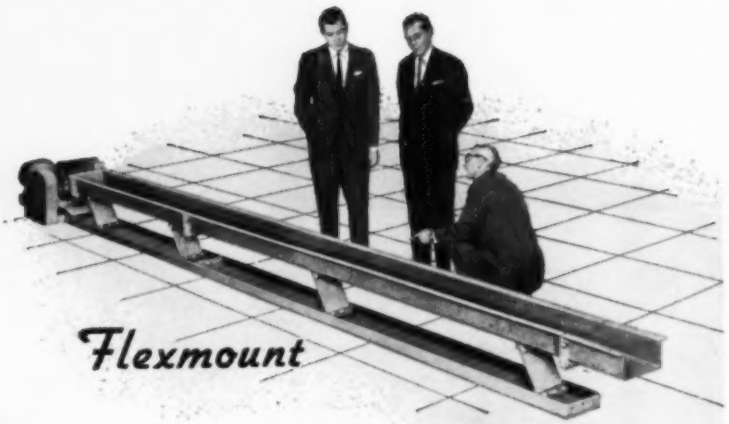
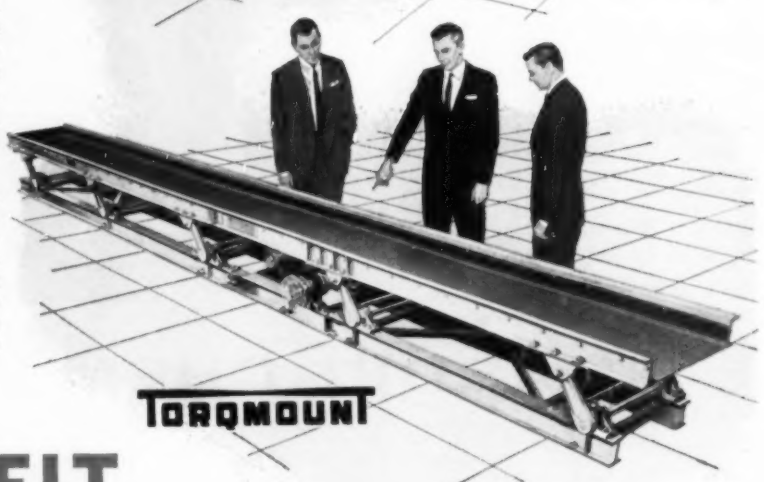
In every case, Link-Belt POSITIVE ACTION controls the load at all times . . . assures continuous, uniform flow of materials regardless of surges. And each type functions as near to NATURAL FREQUENCY as possible, minimizing power requirements.

For the best in light-, medium- or heavy-duty conveying, call your nearby Link-Belt office or authorized stock-carrying distributor. Or write for new Book 2744 containing complete data on all three types.





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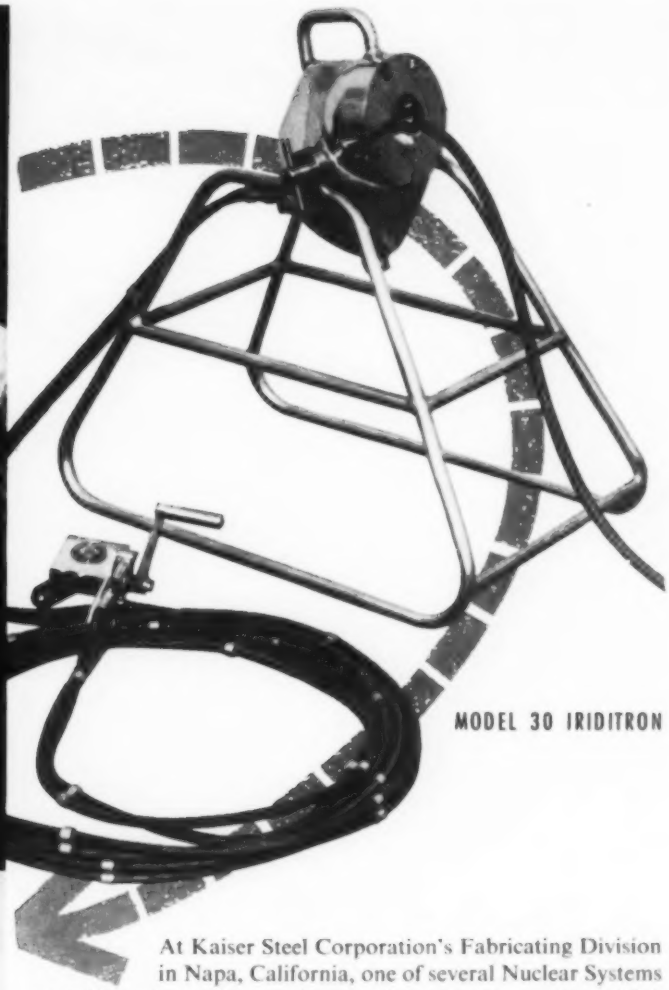
LINK-BELT COMPANY: Executive Offices, Prudential Plaza, Chicago 1. To Serve Industry There are Link-Belt Plants, Sales Offices, Stock Carrying Factory Branch Stores and Distributors in All Principal Cities. Export Office, New York 7; Australia, Marrickville (Sydney); Brazil, Sao Paulo; Canada, Scarboro (Toronto 13); South Africa, Springs. Representatives Throughout the World. 15.121

COMPLETING THE PICTURE . . .

Nuclear Systems Economical, Portable Radiography Machines



MODEL 30 IRIDITRON

At Kaiser Steel Corporation's Fabricating Division in Napa, California, one of several Nuclear Systems portable radiography machines is brought into position. This man is using a light, easily carried Model 30 with an Iridium 192 source to spot-check plate welds on the bow section of a steel barge. The steel is a half inch thick.

Companies all over the country are saving time and money . . . keeping weld quality high . . . by inspecting with radiography machines from Nuclear Systems.

If you have an inspection problem, Nuclear Systems has a safe, portable, economical radiography machine to suit your needs. For full information, contact Dept. F-8 at one of our sales offices. Also . . . inquire about Nuclear Systems regularly scheduled three-day Radiation Health Physics Course — an approved AEC licensing aid.

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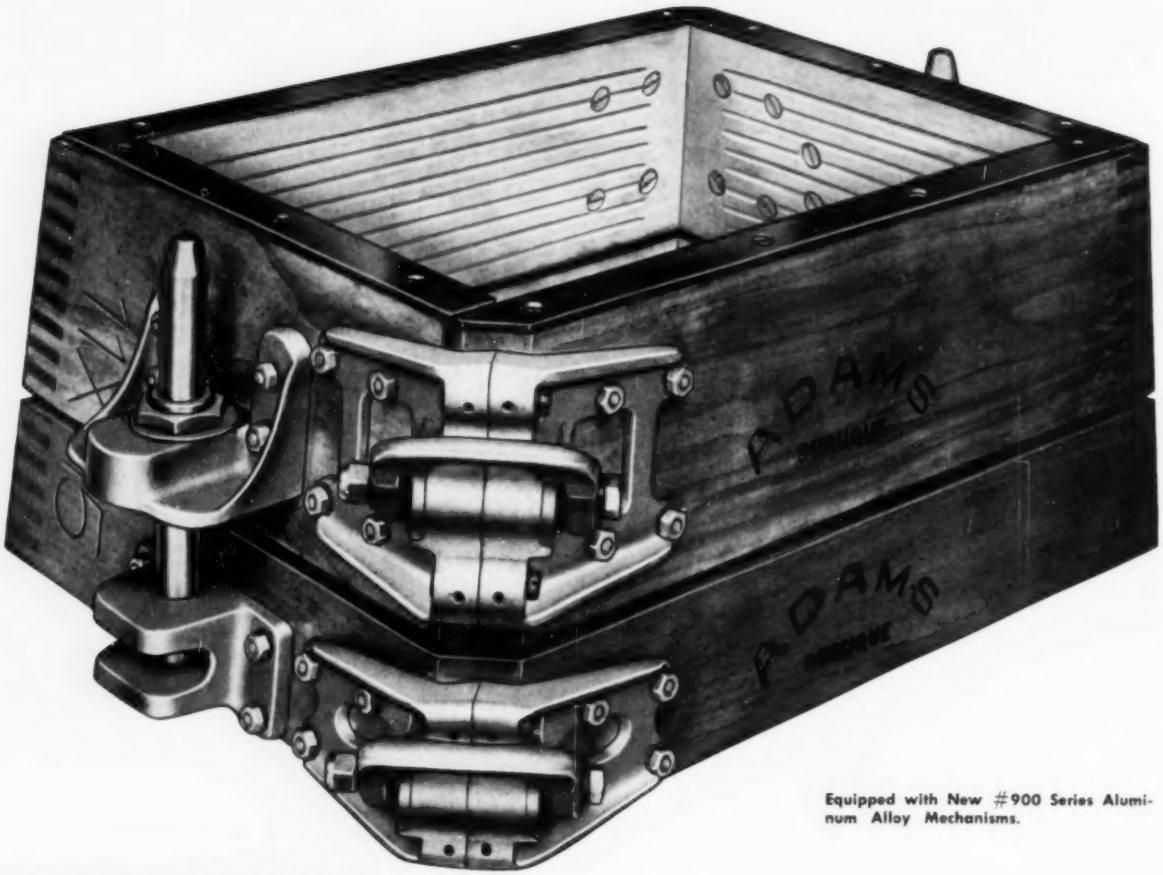
Circle 577 on Page 85



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ADAMS CHERRY EASY-OFF FLASK

MAKE REAL SAVINGS FROM THESE ADVANTAGES!

CHERRY EASY-OFF FLASKS are of proven design and construction.

CHERRY LUMBER is the finest available, carefully selected and thoroughly air dried.

SIDES AND ENDS finished 1⅛" on all standard size flasks. 1¼" and heavier on flasks of larger perimeters and greater depths.

SOLID CORNERS are machine dovetailed and maintained in rigidness through dipping in "Hot Glue" and machine locking.

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OPERATING MECHANISMS are identical with those used on the Adams Aluminum Easy-Off Flask and incorporate the same simple adjustment and reversal of locking position.

STEEL PROTECTING STRIPS are standard equipment at top, bottom and parting. Aluminum strips available upon request at no extra charge.

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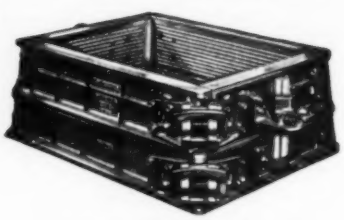
PIN AND EAR ARRANGEMENT available to interchange with present pattern plate guides.

A COMPLETE LINE. Adams flask equipment meets your requirements in practically all methods of production. Before you invest, get the Adams story first. Write today for our big profit-making catalog.



Adams Aluminum Easy-Off Flask

Adams Jackets, Cast Iron or Aluminum

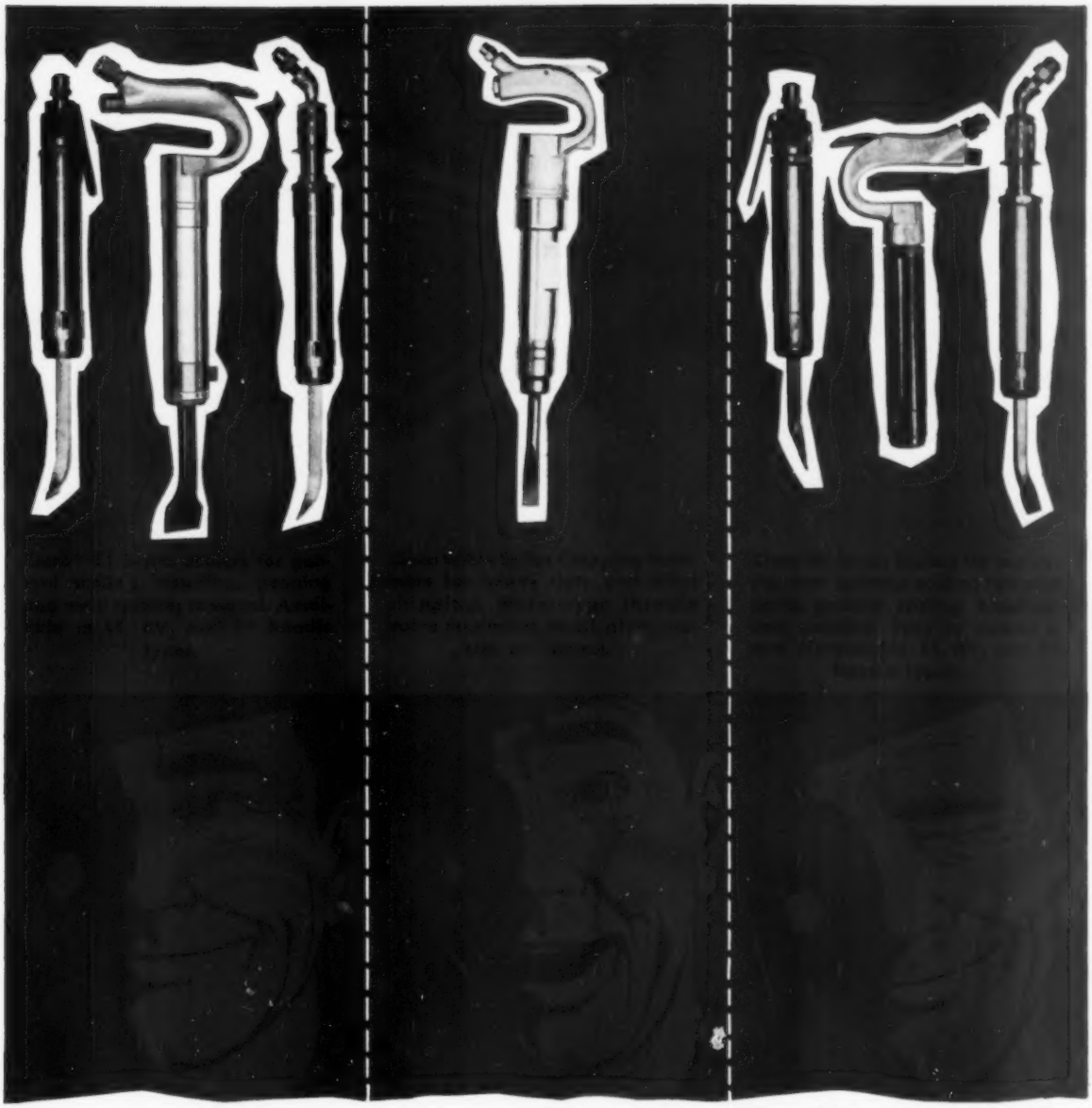
The ADAMS Company

ESTABLISHED 1883

700 FOSTER STREET, DUBUQUE, IOWA, U.S.A.

MOLDING MACHINES and FLASK EQUIPMENT

Circle 578 on Page 85



Look them over, try them out, and you'll probably specify Cleco chippers and scalers

There's just no way to go wrong when you specify Cleco chippers or scalers. These rugged tools are industry renowned for their job efficiency; for their outstanding utility, interchangeability, and dependability features. Before buying your next chipper or scaler—try Cleco. The Cleco line includes a model to fit your particular job requirements.

For a free demonstration-tryout, call your local Cleco representative. For descriptive literature write:

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A DIVISION OF REED ROLLER BIT COMPANY

P. O. Box 2119 • Houston 1, Texas

IN CANADA: Cleco Pneumatic Tool Company of Canada, Ltd., 927 Millwood Road, Leaside (Toronto), Ontario

*Trademark.

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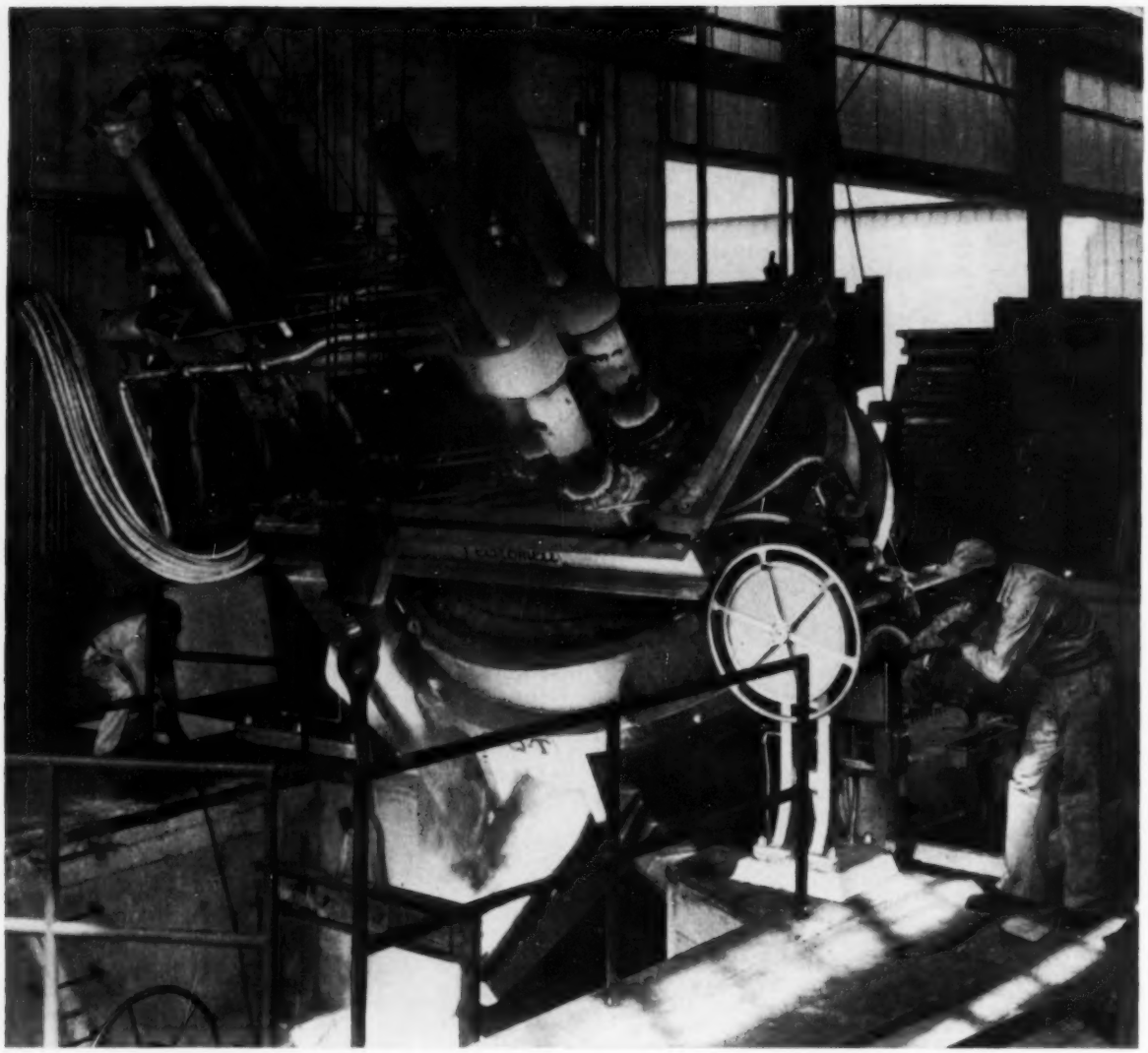

LECTROMELT Melts–Taps–Recharges Fast ...GIVES MAXIMUM OUTPUT

Lectromelt furnaces are powered to speed up melting greatly. You tilt and pour smoothly and quickly... and the Lectromelt top-charging arrangement is planned to minimize your down-time between heats.

In every detail, Lectromelt furnaces are designed to give you efficient melting for years to come. If you're planning new capacity, you'll find it pays to contact Lectromelt—world's most experienced builder of electric furnaces. Lectromelt Furnace Division, McGraw-Edison Company, 314 32nd Street, Pittsburgh 30, Pennsylvania.

FOR THE MOST EFFICIENT MELTING–Lectromelt®

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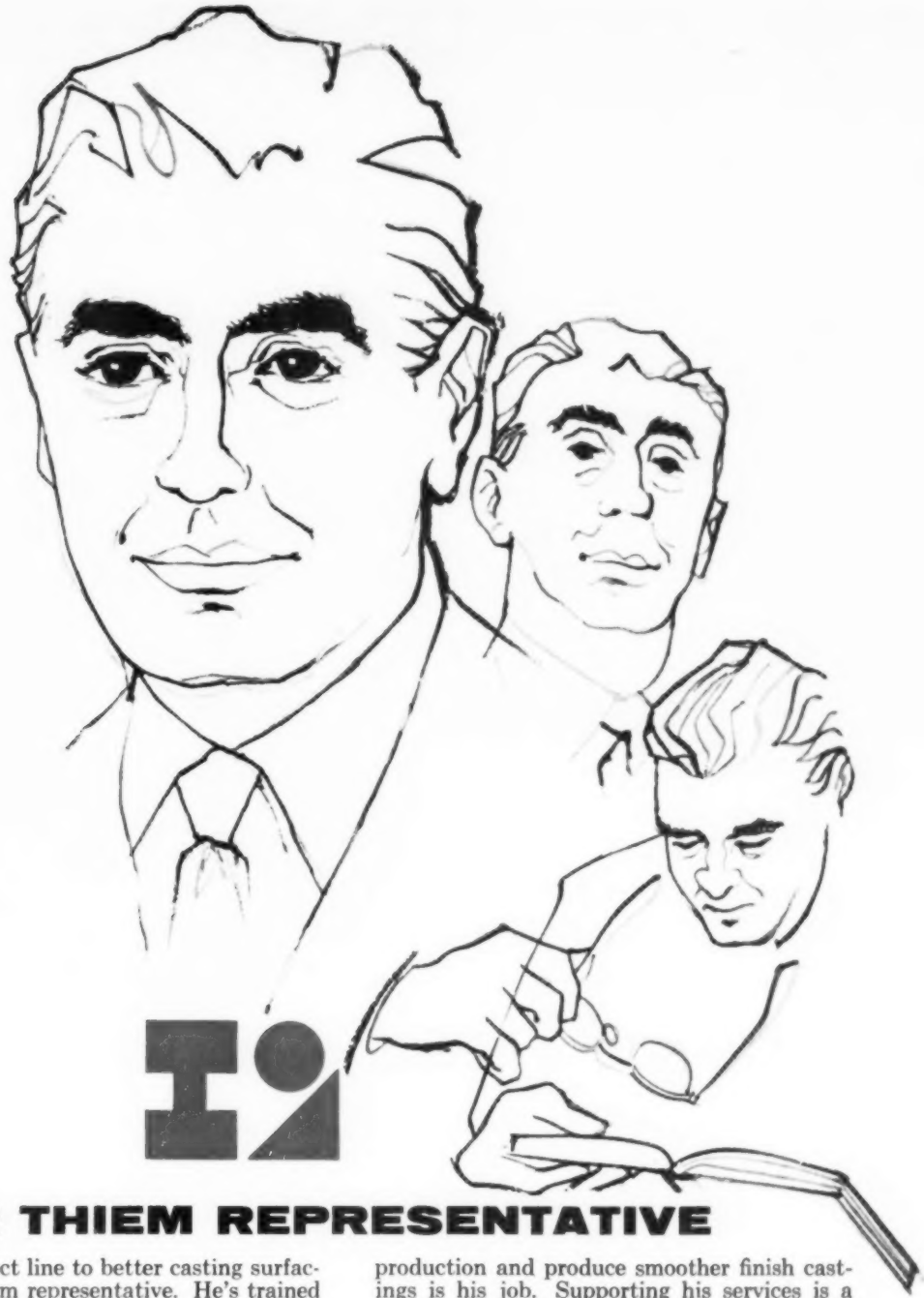
Circle 580 on Page 85



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Your most direct line to better casting surfaces is your Thiem representative. He's trained in foundry fundamentals and better foundry methods. Knowing how to improve casting production and produce smoother finish castings is his job. Supporting his services is a modern laboratory exclusively devoted to foundry research.

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THIEM PRODUCTS INC.

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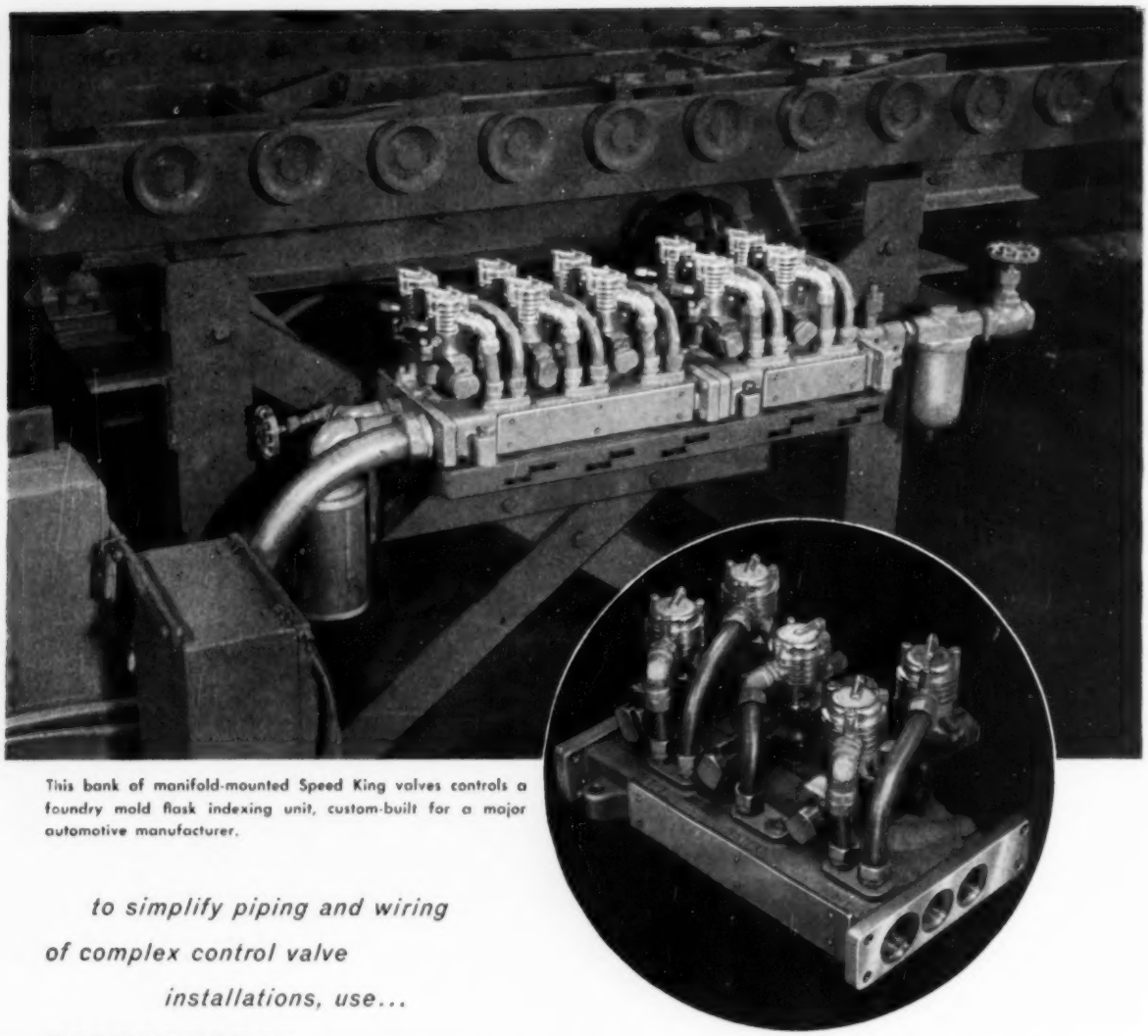
Manufacturers of foundry products exclusively

Circle 581 on Page 85



This bank of manifold-mounted Speed King valves controls a foundry mold flask indexing unit, custom-built for a major automotive manufacturer.

to simplify piping and wiring of complex control valve installations, use...

VALVAIR'S NEW SPEED KING® MANIFOLDS

Cut material and assembly labor costs on multiple control valve installations . . . use Valvair's new 2 and 3-station manifolds! Common inlet, exhaust and wiring passages, plus equally-spaced cylinder ports, eliminate unnecessary piping and wiring . . . keep installations neat. Cast aluminum manifolds may be ganged for installation of any number of valves. O-rings assure leak-free connections.

VALVES – 2 or 3 stations for 3/8-3/4 in. NPT standard Speed King or 1/4 in. NPT plug-in Speed King Valves, single or double solenoid, 2, 3 or 4-way. Remote operated, speed controlled* and power-centered neutral* valves may be used in any number and combination.

PIPING – Intake and exhaust ports common to all stations. Pipe threads, both ends, and O-ring grooves.

PORTING – Optional size cylinder ports. Side and bottom outlets, flush pipe plugs.

WIRING – Large conduit passage, with side access cover, common to all stations. Pipe threads, both ends, and O-ring grooves. Pilot leads (standard Speed King valves) encased in flexible conduit, integral pilot connections for 1/4 in. NPT plug-in Speed Kings.

MOUNTING – 2 mounting points per manifold. For ganging, kits of O-rings and through bolts are offered.

**Standard Speed King valves only.*

Easier in-use service is another benefit! Individual pilots, valves or entire manifolds are replaceable as units to minimize machine downtime.

And, Speed King manifolds *are available for immediate delivery from stock.* Before you engineer new equipment or up-grade machines now in service, investigate the design and cost advantages of Valvair Speed King manifolds.

For more information, write for Bulletin D-58. Address Dept. O859, Valvair Corporation, 454 Morgan Ave., Akron 11, Ohio.

Representatives in principal cities.

Valvair AKRON 11, OHIO

DIVISION OF INTERNATIONAL BASIC ECONOMY CORPORATION (IBEC)

Other INDUSTRIAL DIVISIONS of IBEC: The Sinclair-Collins Valve Co., The Bellows Co., Akron, Ohio • V. D. Anderson Co., Cleveland, Ohio

B005

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Late News

STEEL STRIKE: Production of castings will be cut somewhat by the steel strike, even though the deadlock has forced relatively few foundries to close. Biggest tonnage losers will be ingot mold foundries of steel mills; recently they have been casting 250,000 tons monthly.

In addition to the lost output of ingot mold and other steel mill foundries, there will be curtailment in shipments by foundries supplying maintenance and repair castings to the steel industry. Stocks of steel consumers generally are in good shape; so if the strike presists it will be a number of weeks before those also using castings will be forced to hold up receipts of foundry products.

PAST PATTERNS: In an average year, July shipments of gray iron castings represent 7 per cent or better of the year's total. During the steel strike years of 1956 and 1952, the July output accounted for 5.5 and 5 per cent, respectively. In those same years, July shipments of steel castings contributed about 6 per cent of the annual tonnages, compared with 7 per cent or more normally.

IRON STOCKS ADEQUATE: Shutting down of blast furnaces poses no particular problem to foundries immediately. Some merchant furnaces are not affected by the strike, and most foundries are sufficiently well stocked for the near future. In addition, consumption is off seasonally.

Blast furnaces set a new production record in the first half, turning out 42.4 million net tons of pig iron and ferroalloys, according to the

Foundry Statistics

Iron and Steel Scrap Consumption

(Gross tons*)

	All Scrap Total	By Types of Furnace — Cupola Total	Air Total	Electric Total
1957	65,688,592	9,220,405	1,026,951	8,876,400
1958				
Feb.	3,491,441	611,394	84,971	466,657
2 mo.	7,503,512	1,316,048	141,966	1,032,882
Mar.	3,718,132	624,165	84,866	524,035
Apr.	3,429,121	599,427	61,839	631,220
May	3,862,491	596,253	59,060	553,756
June	4,409,006	615,271	62,703	605,733
July	3,716,739	543,726	47,203	513,394
Aug.	4,263,034	580,844	66,877	592,727
Sept.	4,472,219	680 660	71,196	637,403
Oct.	5,091,207	707,378	90,707	757,722
Nov.	4,803,615	700,704	74,382	691,078
Dec.	4,973,670	761,494	80,593	712,779
Total	56,242,746	7,725,970	821,388	7,152,726
1959				
Jan.	5,375,042	783,045	86,519	787,289
Feb.	5 657,873	791,137	88,326	801,692
2 mo.	11,050,915	1,574,182	194,845	1,588,981

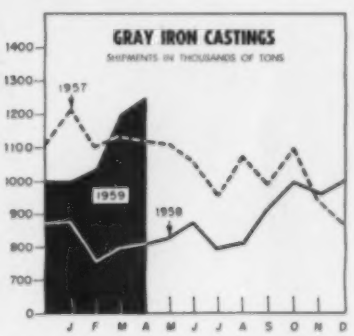
Index of Foundry Equipment Orders

Foundry Trades Only
(Net Orders Closed, New Equipment)

	1958	1959
Jan.	57.9	127.4
Feb.	57.6	237.1
Mar.	85.9	168.6
Apr.	88.7	154.2
May	136.1	157.0
June	87.7	....
July	77.9	....
Aug.	74.1	....
Sept.	64.5	....
Oct.	118.9	....
Nov.	83.3	....
Dec.	137.0	....

Note: Base period 1947-49 taken as 100 per cent monthly average.

Source: Foundry Equipment Manufacturers Association.



GRAY IRON CASTINGS—SHIPMENTS

(Net tons*)

	All Castings Total	All Castings For Sale	Miscellaneous Castings Total	Miscellaneous Castings For Sale	Nodular Iron Castings Total	Heavy Steel Ingot Molds Total	Chilled Railroad Car Wheels Total	Pressure Pipe & Fittings Total[3]	Soil Pipe & Fittings Total[3]	Unfilled Orders[4]
1957	12,664,504	6,876,497	7,786,229	3,310,915	.....	2,409,290	389,333	1,351,345	788,308	.....
1958										
Apr.	806,720	457,498	483,999	210,344	8,015	121,480	25,401	112,292	63,539	582,446
4 mo.	3,223 849	1,730,428	2,067,470	858,991	38,545	498,654	99,648	348,477	211,600	.....
May	820,054	472,192	469,026	203,025	9,511	134,312	23,498	123,017	70,201	570,293
June	867,948	541,904	503,252	245,651	8,951	135,477	22,928	129,671	76,620	572,706
July	791,560	465,650	430,882	185,275	8,696	157,478	19,928	110,790	72,481	580,155
Aug.	802,473	513,862	410,876	265,821	8,323	165 006	18,537	129,157	78,897	614,199
Sept.	916,704	537,717	518,185	227,414	7,902	175,323	20,783	125,693	76,720	644,834
Oct.	992,730	586,614	551,380	253,062	10,857	207,500	22,970	129,375	81,595	619,667
Nov.	958,306	505,290	575,586	231,689	11,731	201,704	18,801	98,326	63,889	602,375
Dec.	997,608	509,499	628,720	246,289	13,072	208,942	18,021	85,179	56,746	608,096
Total	10,371,232	5,863,154	6,155,377	2,657,197	117,588	1,884,396	285,134	1,277,685	788,479	.....
1959										
Jan.	1,001,771	517,290	625,884	250,181	12 061	214,985	27,656	75,571	58,656	587,245
Feb.	1,036,855	538,514	642,882	252,115	12,619	230,706	31,033	76,147	55,885	767,360
Mar.	1,205,572	666,034	791 527	286,692	13,881	270,293	35,820	108,131	89,801	846,937
Apr.	1,245,702	688,755	726,105	295,982	14,663	276,476	35,655	129,861	83,605	892,214
4 mo.	4,489,710	2,410,693	2,696,118	1,084,950	53,224	986,460	130,160	389,709	287,347	.....

*Source: U. S. Dept. of Interior Bureau of Mines. [2]Source: Bureau of Census. [3]For sale only. [4]All cast iron pipe is shipped for sale.

Late News

American Iron and Steel Institute. The previous record—41.7 million tons—was set in 1957. June output of 7.3 million tons compares with 4.4 million a year ago.

RAILROADS HELP: Demand for railroad equipment is helping to raise steel foundry operations markedly from the extremely low level of last summer. Since July, 1958, shipments of all types of steel castings by jobbing foundries have increased more than 100 per cent and deliveries of railway specialty castings have nearly quadrupled.

Meanwhile freight car buying continues brisk. June orders totaled 8054, against 5253 in May and only 317 a year ago. Car shops delivered 3950 cars last month, leaving a backlog of nearly 41,000 units. Unfilled orders totaled 27,757 on July 1, 1958.

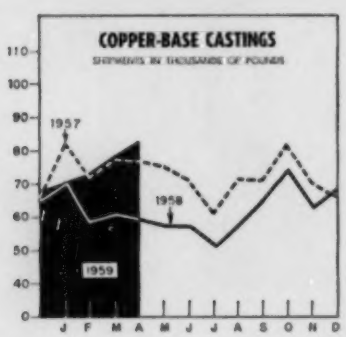
HANDLING SPURTS: Orders for industrial material handling equipment have reached the highest level in nearly three years. Bookings index of the Material Handling Institute topped 164 in May, against 147 in April and 118 a year ago. It was the best month since August, 1956. The institute anticipates continued good business through this year.

FURNACES ACTIVE: Demand for industrial furnaces continues at approximately double the 1958 pace. June orders of about $7 million compare with $3,672,000 a year ago, the Industrial Heating Equipment Association reports. First-half bookings were nearly $38 million, against slightly under $18 million in the last year's period.

FOR SALE: E. W. Bliss Co. will sell its plant at Toledo, O. The facilities have been idle for more than a year, with manufacturing consolidated at the company's other plants. The Toledo property includes a 165,000-sq-ft gray iron foundry capable of handling castings weighing up to 60 tons.

PERSONALS: William R. Butler has been appointed manager of castings sales, Aluminum Co. of America, Pittsburgh . . . Louis V. Abrams has joined Pangborn Corp., Hagerstown, Md., as administrative assistant to the president . . . Herbert R. Kalmbach has been promoted to production manager, Cleveland Foundry, Ford

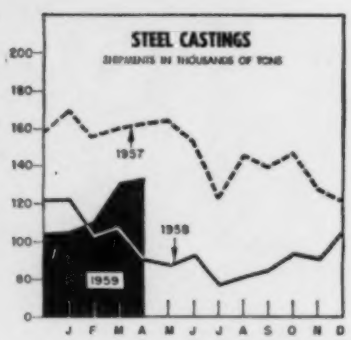
Foundry Statistics



COPPER-BASE CASTINGS

(Shipments of castings—1000 pounds[1])

	Shipments			
	Total	Sand	Perm. Mold	Unfilled Orders[2]
1957	874,627	759,014	44,789	.....
1958				
Apr.	89,311	53,271	3,385	25,621
4 mo.	247,531	223,131	13,309	.....
May	57,506	51,634	3,077	22,867
June	57,124	51,967	3,001	21,578
July	51,124	46,636	2,351	20,518
Aug.	57,790	52,981	2,425	24,851
Sept.	64,447	58,435	2,888	25,655
Oct.	74,012	67,564	3,239	26,726
Nov.	62,746	57,386	2,604	24,928
Dec.	67,905	61,119	3,535	25,078
Total	740,153	670,873	36,429	.....
1959				
Jan.	70,123	62,286	3,753	25,344
Feb.	72,754	64,558	4,697	26,468
Mar.	78,641	69,472	4,333	29,373
Apr.	82,577	73,346	4,640	29,941
4 mo.	304,095	269,642	16,723	.....



STEEL CASTINGS—SHIPMENTS

(Net tons[1])

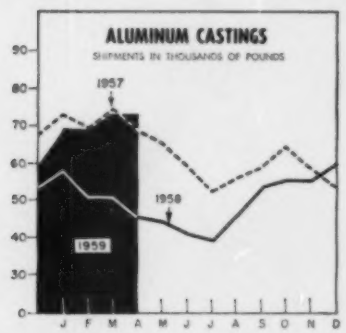
	All Castings			Carbon			Alloy			
	Total	For Sale	Railway Specialties	Total	For Sale	Railway Specialties	Total	For Sale	Railway Specialties	Unfilled Orders[2]
1957	1,766,191	1,359,747	349,059	1,328,478	1,019,090	324,951	437,713	340,657	24,108	.....
1958										
Apr.	91,464	69,121	11,956	65,639	48,998	11,107	25,825	20,123	849	229,503
4 mo.	421,716	325,741	67,328	305,011	234,190	62,735	116,705	91,551	4,593	.....
May	87,002	66,058	10,416	61,105	45,967	9,463	25,897	20,119	953	211,346
June	92,861	71,624	14,185	67,227	50,919	12,987	25,634	20,705	1,198	190,779
July	68,802	48,618	5,400	46,558	32,161	4,656	21,944	16,457	744	200,272
Aug.	80,886	59,816	8,021	57,539	42,089	7,090	23,347	17,447	931	196,300
Sept.	85,277	64,566	9,295	60,392	44,890	7,905	24,885	19,696	1,390	196,482
Oct.	95,389	73,367	12,254	67,906	51,065	10,980	27,483	22,302	1,274	184,925
Nov.	85,267	63,788	9,649	59,793	45,808	8,501	25,474	19,980	1,147	193,960
Dec.	103,500	81,360	13,187	76,015	59,171	11,934	27,785	22,189	1,253	214,352
Total	1,211,000	856,956	142,644	801,846	606,240	136,251	319,254	250,716	10,393	.....
1959										
Jan.	105,392	82,683	14,408	76,242	59,027	12,948	29,150	23,656	1,460	232,646
Feb.	110,280	86,013	14,886	79,365	61,261	13,316	30,645	24,752	1,570	245,096
Mar.	131,317	103,848	20,086	93,309	75,968	16,410	35,008	27,880	1,676	270,682
Apr.	134,344	104,890	21,372	99,295	57,041	19,761	35,049	28,088	1,611	271,613
4 mo.	481,333	377,434	70,552	348,211	253,297	64,435	129,852	104,376	6,117	.....

[1]Source: Bureau of Census. [2]For sale only.

Motor Co. He is succeeded as superintendent of the afternoon shift by Peter Rock . . . Paul J. Chaney has been named general sales manager, Metals Processing Div., Curtiss-Wright Corp., Buffalo, and will be responsible for national distribution of forgings, extrusions, and castings . . . Robert A. Barr has been appointed general manager, Refractories Div., Babcock & Wilcox Co., New York . . . New appointments at Ajax Magnethermic Corp., Youngstown, Ohio, include Manuel Tama, vice president, Ajax Engineering Div., and Melvin A. Raney, vice president, Ajax Electrothermic Div., both in Trenton, N. J. . . . Walter H. Flynn has become general sales manager, Lebanon Steel Foundry, Lebanon, Pa. . . . William Rodgers has been named senior vice president, Blaw-Knox Co., Pittsburgh. He will continue as general sales manager.

OBITUARY: William B. Neal, 73, vice president, Attalla Pipe & Foundry Co., Attalla, Ala., died June 28 in Oak Park, Ill. . . . Albert S. Kux, 75, president, Kux Machine Co., Chicago, died there July 19 . . . Joseph A. King, 62, sales engineer, Republic Coal & Coke Co., Chicago, died there July 15 . . . James L. Morrison, 85, president, M. & M. Foundry, Hamburg, Pa., and Morrison Machine Co., Paterson, N. J., died July 20 in Paterson.

MISCELLANY: Howe Sound Co., Salt Lake City, Utah, which recently purchased Crucible Steel Casting Co., Milwaukee, is reported also to have acquired Misco Precision Casting Co., Whitehall, Mich., and Wai-Met Alloys Co., Detroit, from Consolidated Foundries & Mfg. Corp., Chicago . . . National Malleable & Steel Castings Co., in reporting an increase of nearly 40 per cent in first-half sales compared with 1958, said it will reopen its Indianapolis Works soon . . . John Blue Co., Huntsville, Ala., farm implement manufacturer, will spend $200,000 for a new foundry double the size of its existing foundry . . . Primary aluminum production in June set a new record at 167,323 tons, and first-half output of 942,399 tons was nearly 20 per cent larger than a year ago . . . Belle City Malleable Iron Co., Racine, Wis., has started a million-dollar plant improvement program which will include a new building, a mechanized molding line, and other equipment.



PRODUCTION WORKERS

Estimated Number

	Apr. 1959	Mar. 1959	Apr. 1958
Ferrous	194,200	189,600	163,500
Nonferrous	52,600	52,300	43,900

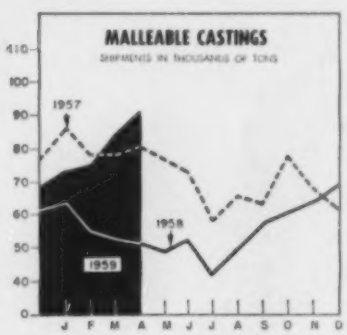
Average Weekly Earnings

Gray Iron	$96.48	$95.36	$78.62
Malleable Iron	97.10	94.87	80.33
Steel	103.63	104.24	88.08
Nonferrous	99.03	95.71	88.86

Average Weekly Hours

Gray Iron	40.2	39.9	35.1
Malleable Iron	40.8	40.2	35.7
Steel	40.8	41.2	36.7
Nonferrous	41.1	40.6	38.3

Source: Bureau of Labor Statistics.



ALUMINUM CASTINGS

(Shipments of castings—1000 pounds[1])

	Shipments Total	Sand	Perm. Mold	Die	Unfilled Orders[2]
1957	751,818	143,991	232,326	373,586	.....
1958					
Apr.	44,948	9,531	13,389	21,956	60,317
4 mo.	204,035	39,167	62,162	102,090	.....
May	44,093	9,312	13,648	21,091	59,666
June	40,791	8,644	13,679	18,292	63,670
July	38,818	8,656	12,342	17,714	68,618
Aug.	45,034	9,034	14,426	21,505	71,135
Sept.	52,796	10,261	16,241	26,254	72,819
Oct.	55,699	10,932	17,189	27,511	73,474
Nov.	55,793	10,539	16,942	28,264	76,370
Dec.	50,487	10,874	15,970	29,579	78,732
Total	596,456	117,421	195,599	292,300	.....
1959					
Jan.	68,896	11,238	24,844	32,813	83,314
Feb.	68,381	10,862	25,428	32,147	82,001
Mar.	73,351	12,412	26,964	33,949	82,676
Apr.	73,040	12,695	26,204	34,009	85,869
4 mo.	283,668	47,147	103,440	132,918	.....

[1]Source: Bureau of the Census. [2]For sale only.

MALLEABLE IRON CASTINGS

(Shipments of castings—net tons[1])

	Shipments Total	For Sale	Standard Total	For Sale	Pearlitic Total	For Sale	Unfilled Orders[2]
1957	862,076	520,118	713,539	431,662	149,437	88,456	.....
1958							
Apr.	50,695	29,388	41,794	23,605	8,901	5,783	47,664
4 mo.	219,787	124,938	182,071	101,835	37,766	23,103	.....
May	48,306	26,656	40,092	21,710	8,214	4,946	46,603
June	51,882	31,077	42,910	25,679	8,972	5,398	48,260
July	41,865	24,479	33,857	20,023	8,008	4,456	58,340
Aug.	49,252	29,414	41,734	24,896	7,518	4,718	55,145
Sept.	56,836	31,999	45,945	26,370	10,891	5,629	58,405
Oct.	60,981	40,014	50,181	31,992	10,800	8,022	63,425
Nov.	63,336	35,221	50,063	28,409	13,273	6,812	66,725
Dec.	68,385	40,041	53,797	32,883	14,588	7,158	66,725
Total	680,640	382,539	540,680	313,597	129,050	70,242	.....
1959							
Jan.	73,186	43,667	56,700	35,139	16,486	8,528	77,322
Feb.	74,760	42,093	57,573	31,976	17,187	10,117	90,291
Mar.	84,335	49,660	67,439	40,515	16,896	9,175	92,822
Apr.	90,974	54,306	75,583	43,835	15,391	10,471	102,508
4 mo.	323,255	189,726	257,295	151,465	65,960	38,291	.....

Prices of Foundry Metals and Coke

(As of July 27, 1959)

FOUNDRY COKE

(Per net ton, f.o.b. ovens)

BEEHIVE

Connellsville	$18.00-18.50

OVEN

Birmingham	$30.35
Buffalo	32.00
Detroit	32.00
Erie, Pa.	32.00
Indianapolis	31.23
Kearny, N. J.	31.25
Milwaukee	32.00
Neville Island (Pittsburgh)	30.75
New England, deld.	33.55
New Haven, Conn.	31.00
Painesville, O.	32.00
Philadelphia	31.00
St. Louis	33.00
St. Paul	31.25
Swedeland, Pa.	31.00
Terre Haute, Ind.	31.25

PIG IRON

(Per gross ton, f.o.b. furnace)

	No. 2 Foundry	Malleable
Birdsboro, Pa.	$68.50	$69.00
Birmingham	62.50	63.50
Buffalo	66.50	67.00
Chester, Pa.	68.50	69.00
Chicago	66.50	66.50
Cleveland	66.50	66.50
Duluth	66.50	66.50
Erie, Pa.	66.50	66.50
Everett, Mass.	68.00	68.50
Fontana, Calif.	72.50	....
Geneva, Utah	66.50	....
Granite City, Ill.	68.40	68.90
Neville Island (Pittsburgh)	66.50	66.50
Swedeland, Pa.	68.50	69.00
Toledo, O.	66.50	66.50
Troy, N. Y.	68.50	69.00
Youngstown, O.	....	66.50

NONFERROUS INGOT

(Cents per pound, carlots)

BRASS AND BRONZE: Red brass, No. 115, 29.25; tin bronze, No. 225, 39.75; No. 245, 33.50; high-leaded tin bronze, No. 305, 33.50; No. 1 yellow, No. 405, 23.75; manganese bronze, No. 421, 26.75.

ALUMINUM: 99 per cent plus primary ingots 26.80. Secondary No. 12 alloy, 23.75–24.00. Deoxidizing grades: No. 1, 24.50; No. 4, 21.50.

MAGNESIUM: 99.8 per cent notched ingots 36.00, f.o.b. Velasco, Tex. (10,000 lb or more).

COPPER: Electrolytic 30.00, delivered Connecticut valley.

ZINC: High grade 12.00, delivered. Die casting alloy No. 3, 14.00; No. 2, 14.50, delivered.

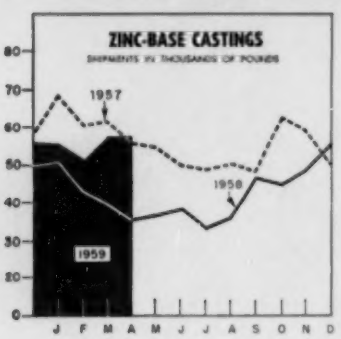
IRON AND STEEL SCRAP

(Consumer prices per gross ton delivered, except as otherwise noted)

	No. 1 Heavy Melting Steel	No. 1 Cupola Cast	Heavy Breakable Cast	Clean Auto Cast	Machinery Cast	Malleable	Short Steel Rails
Birmingham	$35.00-36.00	$55.00-56.00	....	....	....	....	....
Boston*	**26.00-27.00	**33.00	....	....	**34.00	....	....
Buffalo	33.00-34.00	**42.00-43.00	....	....	**46.00-47.00	....	51.00-52.00
Chicago	37.00-38.00	52.00-53.00	....	58.00-59.00	58.00-59.00	59.00-60.00	55.00-57.00
Cincinnati*	**35.50-36.50	**46.00-47.00	**42.00-43.00	....	**52.00-53.00	....	**55.00-56.00
Cleveland	38.00-39.00	47.00-48.00	38.00-39.00	52.00-53.00	52.00-53.00	65.00-66.00	57.00-59.00
Detroit*	**33.00-34.00	**47.50-48.50	**40.00-41.00	**51.00-52.00	....	....	....
Los Angeles	39.00	**47.00	....	....	....	....	....
New York*	30.00-31.00	36.00-37.00	34.00-35.00	....	....	....	....
Philadelphia	40.00	47.00-48.00	43.00-45.00	....	49.00-50.00	67.00-68.00	....
Pittsburgh	39.00-40.00	45.00-46.00	....	46.00-47.00	51.00-52.00	....	58.00-59.00
St. Louis*	33.00	51.00	40.00	54.00	....	....	50.00
San Francisco	36.00	44.00	28.00	40.00	40.00	....	....
Seattle	35.00	34.00	28.00	....	....	....	....

*Brokers' buying prices. **F.o.b. shipping point

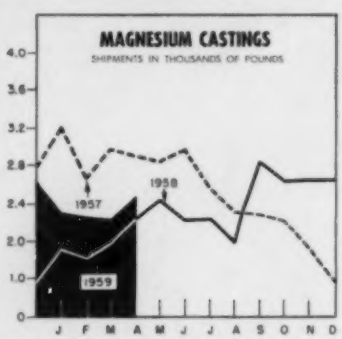
Foundry Statistics



PIG IRON

PRODUCTION**—Net Tons

	Foundry	Malleable & Silvery	Low & Int. Low Phos. & Bessemer
1957	2,275,789	3,697,335	7,452,203
1958			
May	127,428	165,045	396,009
5 mo.	627,022	992,209	1,945,170
June	121,869	167,192	342,617
July	123,075	156,582	402,850
Aug.	141,185	145,216	396,511
Sept.	133,556	234,752	416,026
Oct.	146,386	257,111	575,806
Nov.	175,210	257,131	489,095
Dec.	154,007	272,375	429,299
Total[3]	1,622,320	2,448,917	4,954,554
1959			
Jan.	190,392	283,105	479,619
Feb.	121,716	258,250	312,284
Mar.	173,881	341,218	412,533
April	159,950	296,384	427,227
May	198,126	358,087	474,820
5 mo.	844,065	1,517,493	1,904,722



ZINC-BASE CASTINGS

(Shipments of castings—1000 pounds[1])

	Shipments—Total	Shipments—For Sale	Unfilled Orders[3]
1957	669,775	431,509	.....
1958			
Apr.	35,796	23,830	27,634
4 mo.	168,770	108,462	.....
May	36,447	24,588	33,438
June	38,132	25,993	34,888
July	32,765	22,843	41,534
Aug.	35,869	26,971	45,066
Sept.	47,127	33,520	50,762
Oct.	45,045	36,103	58,154
Nov.	48,431	34,054	57,864
Dec.	52,609	39,768	56,756
Total	508,177	352,302	.....
1959			
Jan.	55,439	38,661	61,192
Feb.	51,368	35,478	57,537
Mar.	57,600	40,700	62,657
Apr.	57,311	40,113	55,916
4 mo.	221,718	154,952	.....

CONSUMPTION*—Gross Tons

	Cupola	Air	Electric
1957	4,160,891	215,178	246,851
1958			
Jan.	306,794	16,102	14,426
Feb.	269,949	14,014	7,740
2 mo.	567,734	30,116	22,166
Mar.	270,214	13,472	8,753
Apr.	262,907	13,975	9,585
May	256,204	12,091	11,764
June	262,883	12,095	15,549
July	239,140	10,550	12,140
Aug.	247,428	13,196	32,309
Sept.	300,173	14,994	27,759
Oct.	300,115	17,393	34,273
Nov.	287,013	14,862	31,397
Dec.	321,741	15,610	25,450
Total	3,314,652	169,267	231,145
1959			
Jan.	321,302	17,113	38,783
Feb.	324,376	17,960	37,414
2 mo.	646,178	35,073	74,197

MAGNESIUM CASTINGS

(Shipments of castings—1000 pounds[1])

	Shipments—Total	Shipments—For Sale	Unfilled Orders[3]
1957	30,322	28,452	.....
1958			
Apr.	2,215	2,141	5,555
4 mo.	7,874	7,487	.....
May	2,422	2,196	5,200
June	2,205	1,996	5,515
July	2,200	2,063	6,708
Aug.	1,869	1,808	6,086
Sept.	2,804	2,581	6,083
Oct.	2,627	2,479	5,463
Nov.	2,615	2,523	4,063
Dec.	2,612	2,354	5,115
Total	27,228	25,517	.....
1959			
Jan.	2,291	2,086	5,001
Feb.	2,249	1,995	4,637
Mar.	2,129	1,924	4,465
Apr.	2,462	2,220	4,805
4 mo.	9,131	8,225	.....

*Source: U. S. Dept. of Interior, Bureau of Mines. **Source: American Iron & Steel Institute. [1]Source: Bureau of the Census. [2]For sale only. [3]Monthly figures do not add up to totals shown because of unreported monthly revisions.

NOW YOU CAN BUY DORCHESTER MC* SAND MULLED

CAN'T FREEZE

SAVES MONEY

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Muller of new design manufactured by National Engineering Company

Another first! Whitehead's new plant at Dorchester. View shows how sands are processed and loaded on freight cars by equipment of latest design.

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Guaranteed Moisture Content Not Above 6%

With Whitehead's new plant in full operation, Dorchester Molding Sands arrive at your foundry completely mulled, if so ordered. Each grain of sand is evenly coated with its natural bond of clay.

Widely used for Cores and Molds in Iron, Steel, Alloys, and Non-Ferrous Castings, the famous Dorchester Molding Sands are noted for Colloidal clay giving high green and dry strength. Because of the low fines in grain distribution, these sands have a high permeability.

1 ***Moisture Controlled Sands Do Not Freeze—***

a. Easier to unload . . . means lower unloading costs.

b. Reduces handling costs to and from storage bins.

2 ***Moisture Controlled Sands Are Economical—***

a. Sand with 15% moisture have 1700 lbs. sand and 300 lbs. water in each ton.

b. Moisture Controlled Sands with 6% moisture have 1880 lbs. sand and 120 lbs. water in each ton.

c. On each ton of Moisture Controlled Sands you SAVE price of sand and freight on 180 lbs. of water. Sand has just right amount of moisture to eliminate dust hazard.

3 ***Ready to Use on Arrival at Foundry—***

a. Dorchester Moisture Controlled Sands and Gravels arrive with proper working moisture content so that they can be used at once.

b. Aids you in control for sand at foundry.

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For cleaner surface, better shakeout

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Circle 583 on Page 85

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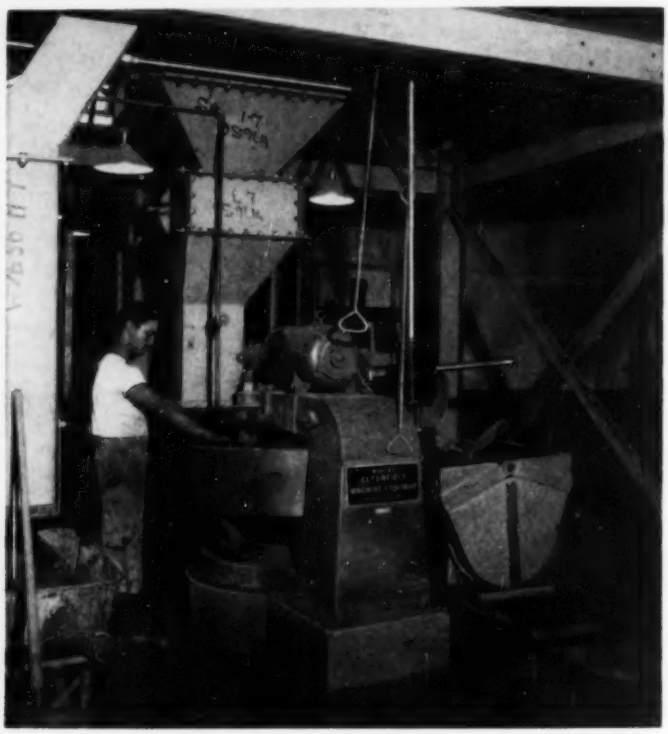

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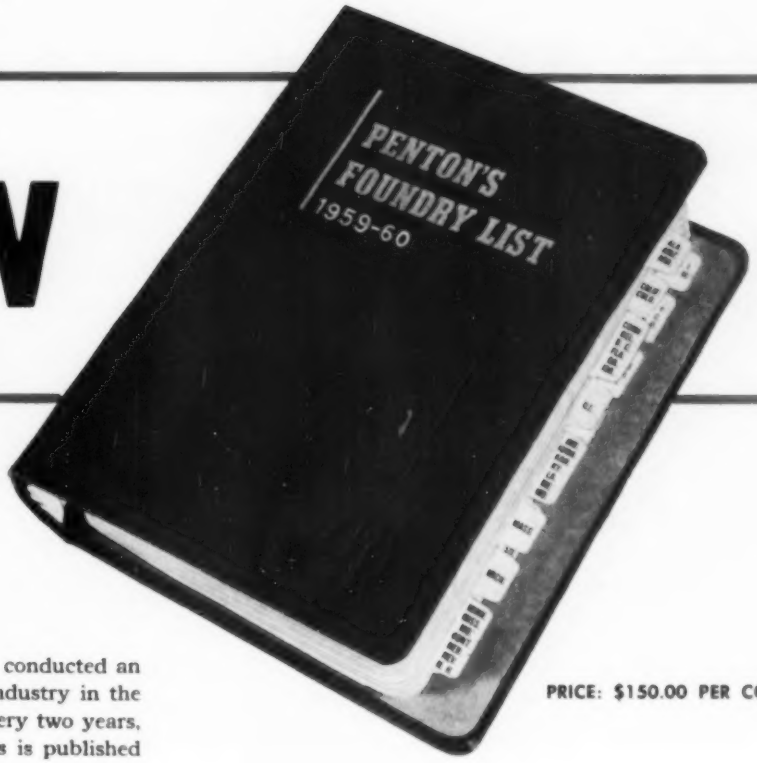
Circle 584 on Page 85

NEW



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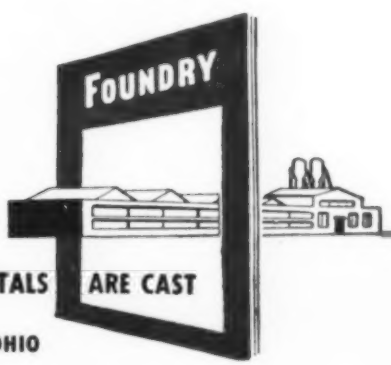

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WHEREVER METALS ARE CAST

A PENTON PUBLICATION, PENTON BUILDING, CLEVELAND 13, OHIO

Circle 585 on Page 85

404 hours of sandblasting

Only 1/32 of an inch change in this nozzle diameter!

Hundreds of hours of useful life remain in the Norton NORBIDE Pressure Blast Nozzle shown in use here. Matter of fact, its *guaranteed minimum service life* with silica sand is 750 hours . . . with steel shot or grit 1500 hours! And this means that it will maintain a concentrated stream contour and high efficiency abrasive velocity *throughout* its life span.

And it's typical of NORBIDE* Pressure Blast Nozzles

The reason that NORBIDE Nozzles perform *efficiently* up to 200 times longer than cast iron nozzles is simple. They're lined with light, tough Norton Boron Carbide — the compound that's only exceeded in hardness by the diamond. It's today's hardest man-made, molded material with an almost unbelievable resistance to wear.

NORBIDE nozzles sharply reduce — by 10% to 20% — the wasteful consumption of compressed air . . . all too frequently neglected in considering the overall cost of pressure blasting.

You can clean all sizes of castings, faster and more economically with Norton NORBIDE Pressure Blast Nozzles. They're available with bores from ⅛" to ⅜"; lengths up to 6". For complete details write NORTON COMPANY, Refractories Division, 310 New Bond Street, Worcester 6, Massachusetts.

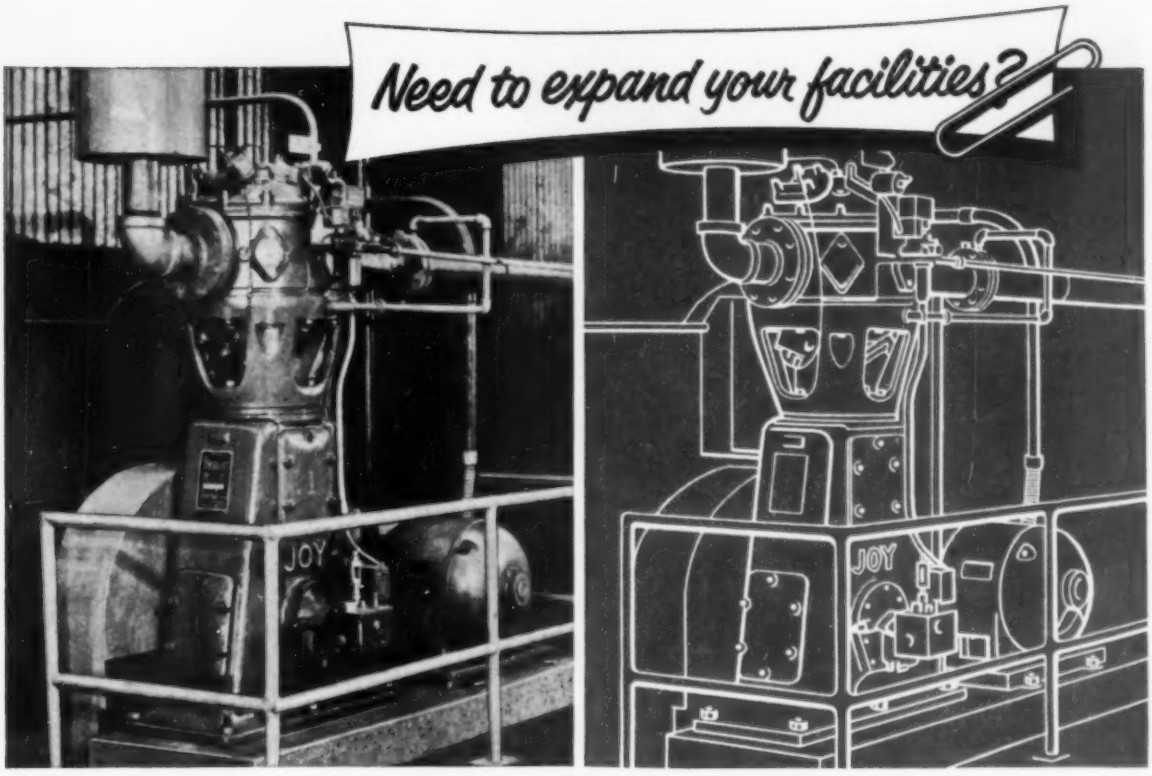
NORTON PRODUCTS Abrasives
Grinding Wheels • Grinding Machines
Refractories • Electrochemicals
BEHR-MANNING DIVISION Coated Abrasives
Sharpening Stones • Pressure-Sensitive Tapes

*Trade-Mark Reg. U. S. Pat. Off. and Foreign Countries

NORTON
REFRACTORIES
Engineered... Rx ...Prescribed

Making better products . . . to make your products better

Circle 586 on Page 85



Add compressed air power efficiently with the JOY WG-9

The Joy WG-9 *heavy-duty* vertical air compressor is a natural for supplying additional air for an existing system, either centralized or decentralized.

Because of its smooth running characteristics and the small floor area required, the WG-9 needs only a simple, block-type foundation. The average base dimensions of a larger model WG-9, *including motor,* are 7′1″ by 4′1″. This means greater capacity per square foot of floor area—42 CFM per square foot on the 100 psi rated machines.

Thus, the WG-9 packs large compressor capacity in a small compressor area. It is possible to install the machine in a central compressor room where unused floor space is at a premium, or in a decentralized plant location where crowding of machinery is a problem.

If you have plans for a small plant, the WG-9 is designed to give you continuous 24-hour heavy-duty service. It is also widely used to meet special requirements in larger operations, such as boosting air above standard plant pressures.

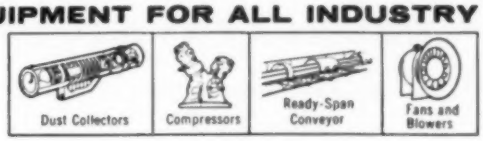
The Joy WG-9 is a water-cooled compressor, available in capacity ranges up to 881 CFM piston displacement and in pressures up to 150 psi. Standard drive is multiple V-belt. This machine can be furnished for flat belt or poly-V drive if desired.

LARGE COMPRESSOR FEATURES INCORPORATED IN ALL WG-9 COMPRESSORS

- Full Force Feed Lubrication
- Joy Patented "Dual-Cushion" Valves
- Anti-friction Main Bearings
- Replaceable Cylinder Liners and Crosshead Guides

Write today for bulletin 22-13.

AIR MOVING EQUIPMENT FOR ALL INDUSTRY



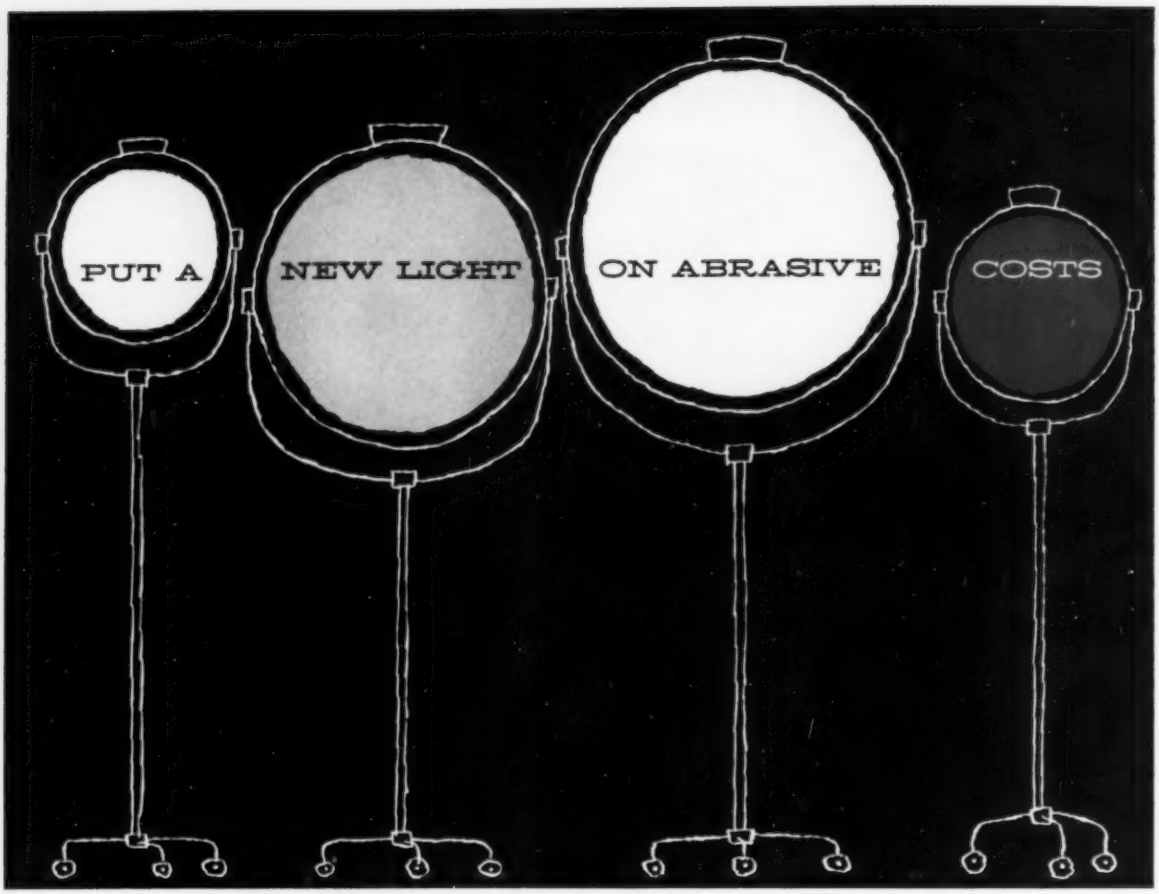
WAD I 5854-22

JOY

Joy Manufacturing Company
Oliver Building, Pittsburgh 22, Pa.

In Canada: Joy Manufacturing Company (Canada) Limited, Galt, Ontario

Circle 587 on Page 85



It takes creative research and an awareness of customer demands to turn out good abrasives. Anything less won't solve the problem.

High quality, efficient shot and grit, applied with good equipment, have a dollars and cents factor that any good ring-wise salesman and cost accountant can appreciate.

Take Cleveland NORMALIZED malleable shot and grit, for instance. It withstands terrific impact without shattering. It has at least twice the life of regular chilled shot and grit. You get 30% to 50% reduction in maintenance costs. Abrasive consumption is materially reduced.

You can put a new light on *your* abrasive costs, by using the Cleveland cost system. It's free and it works. Write us today for more information, together with our new catalog No. 159, or call our nearest representative.

CLEVELAND is the name and the place for PERSUASIVE ABRASIVES

the CLEVELAND metal abrasive company

GENERAL OFFICE: 888 East 67th Street • Cleveland 3, Ohio • PLANTS AT Howell, Michigan; Toledo; Cleveland

World's Largest Production Capacity

Teletype: CV 901

Circle 588 on Page 85

CONTROL MOISTURE . . .

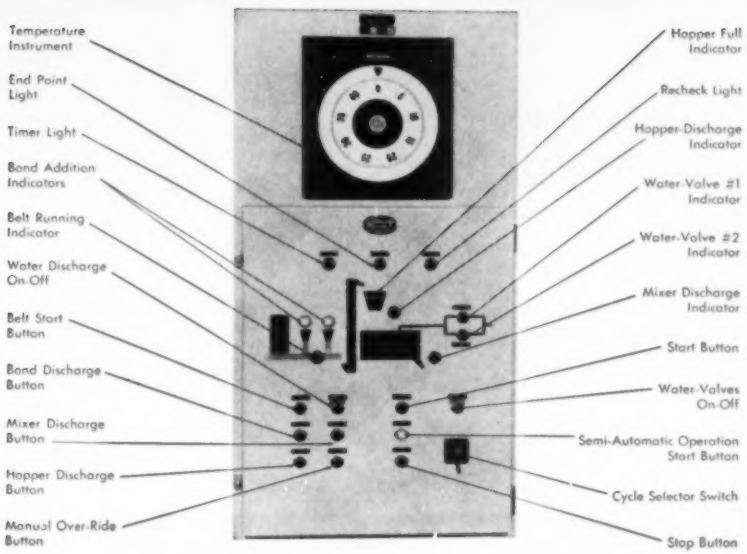
during the entire mixing cycle- AND...

ADD PROFITS!

YOU CAN DO IT BEST WITH A

DIETERT-DETROIT

End Point Automatic Moisture Controller



Unit illustrated is No. 3917 Combination End Point Automatic Moisture Controller and Automull.

The No. 3907 Dietert-Detroit End Point Automatic Moisture Controller . . . highly accurate and quality engineered along traditional Dietert lines . . . automatically regulates the addition of water to sand in a mixer, to produce tempered sand with any desired moisture content.

1. Continuous "recheck" throughout the mixing cycle protects against moisture loss and guarantees maximum accuracy.
2. Base water is added rapidly and blended in over the full cycle. Physical properties of every batch are fully developed.
3. End point is reached slowly to prevent overshooting and assure accuracy.
4. Sand is automatically discharged when correct moisture is stabilized. Cool batches that contain nearly tempered sand are quickly cycled through the mixer. Tonnage is increased and handling costs reduced.
5. Highest quality components minimize maintenance.
6. Constant batch size not necessary.
7. No moving parts in mixer.
8. Single dial controls swift, easy changes in the moisture level and handles a number of different sands.
9. Sealed, plug-in relays and delay timers assure fast, simple maintenance.
10. Cabinet is dust-proof NEMA type 12.
11. Includes remote panel box with sequence indicator lights and control switches.

MAXIMUM **molds per man**

KEEPS PRODUCTION **moving**

reduces CASTING LOSSES

SCRAP RATIO SLASHED TO A **minimum**

DIETERT QUOTES YOU COMPLETE WITH EVERY ACCESSORY YOU NEED! NO HIDDEN EXTRAS!

HARRY W. DIETERT CO.
9330 Roselawn Ave., Detroit 4, Mich.

Rush me details on: ☐ 3907 End Point Moisture Controller. ☐ 3917 Combination End Point Moisture Controller and Automull.

Name _____

Title _____

Company _____

Address _____

City _____ State _____

Circle 589 on Page 85

in the fine FANNER LINE

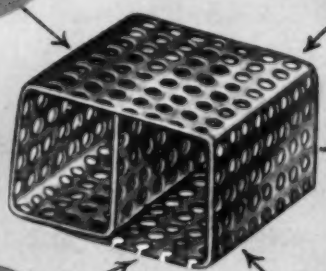
FOR
LIGHT
CASTINGS

PERFORATED CHAPLETS
in a wide range of sizes

LARGE SUPPORT AREA
Holds core more securely in place.

FLEXIBLE SHAPE
10 styles fit any shape or contour — flat, curved, wedge-shaped, bridged or with extended ends.

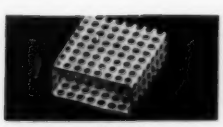
PERFORATIONS
Large number of perforations in light metal insure perfect fusion in light castings.



WILL NOT CHILL
Large perforated area eliminates concentration of metal at any point to chill and cause leaks.

PERFECT VENT
No gas or air pockets to cause "blow-holes", thus perfect ventilation is secured.

ACCURATELY MADE
Produced to exacting standards on specially designed machines to meet specifications.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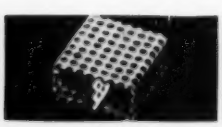
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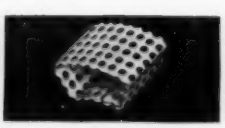
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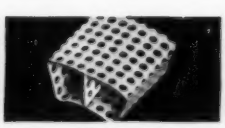
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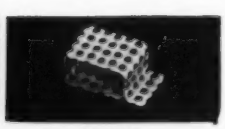
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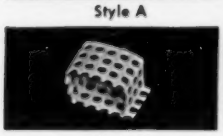
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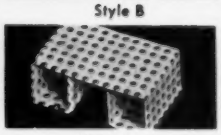
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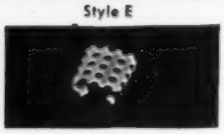
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TYPICAL APPLICATIONS

MANIFOLD

STOVE

Fine FANNER Perforated Chaplets are the perfect answer for many casting applications where there is no need for heavy core support. Their lightweight, wide support area and readily shaped contours, in addition to their many other features make them almost universally adaptable. They are made of tin-coated sheet steel for ferrous castings; and of aluminum, copper or brass for use in castings of these metals—in 38 sizes from ⅛" x ¼" x ¼" to 1" x 2" x 2". Write for catalog

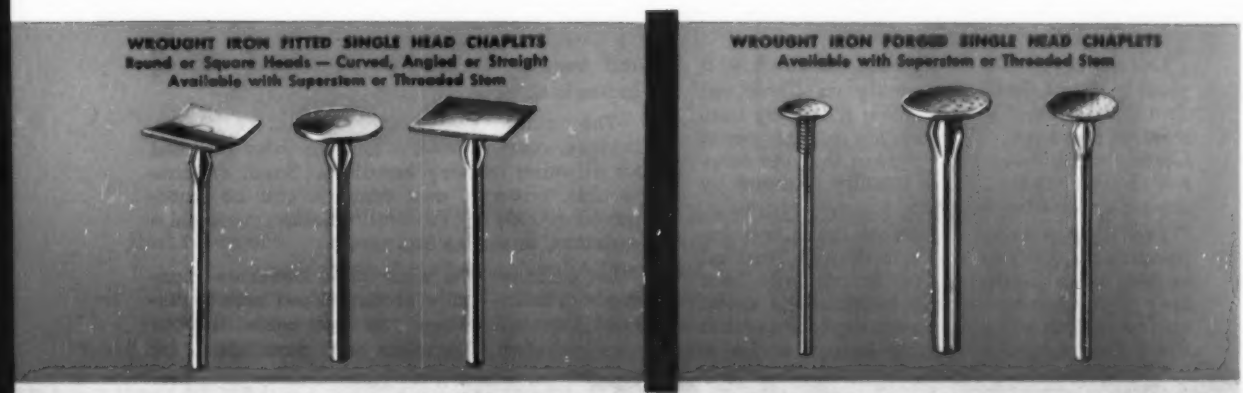
there's the perfect chaplet for every need

FOR **HEAVY** CASTINGS

WROUGHT IRON FORGED OR FITTED

single head chaplets

SPECIAL FORM-FITTING HEADS
Formed to specification to fit cores of almost any desired shape.
COUNTERSUNK SHOULDER
Tapered Fanner design provides more complete contact with molten metal by eliminating corners where gas pockets form.
NON-SLIP HEAD
Prevents side-slipping, provides more rigid support when in place.
HEAVY SHOULDER
Extra-heavy construction at shoulders provides maximum support for heavy cores without excess of metal.
SUPERSTEM CONSTRUCTION
Broad angle Superstem provides extra strength and greater fusion area for molten metal. Furnished with Groovestem when specified.
FORGED HEAD
Upset in forging to three times stem diameter, extra strength offers greatest support to core.


WROUGHT IRON FITTED SINGLE HEAD CHAPLETS
Round or Square Heads — Curved, Angled or Straight
Available with Superstem or Threaded Stem
WROUGHT IRON FORGED SINGLE HEAD CHAPLETS
Available with Superstem or Threaded Stem

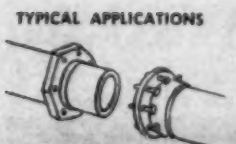
These two types of FANNER Chaplets can be depended upon to handle the heaviest cores. Seven head sizes and stems from 3" to 20" are available for immediate delivery. Remember, when you standardize on FANNER, you always get exactly the right chaplet for every need!

THE FANNER MANUFACTURING COMPANY

Designers and Manufacturers of Fine Fanner Chaplets and Chills

BROOKSIDE PARK CLEVELAND 9, OHIO

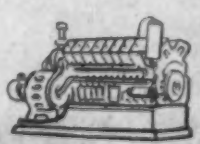
TYPICAL APPLICATIONS



SOIL PIPE

HEAVY DUTY PUMP

HEAVY TRACTOR



DIESEL MOTOR

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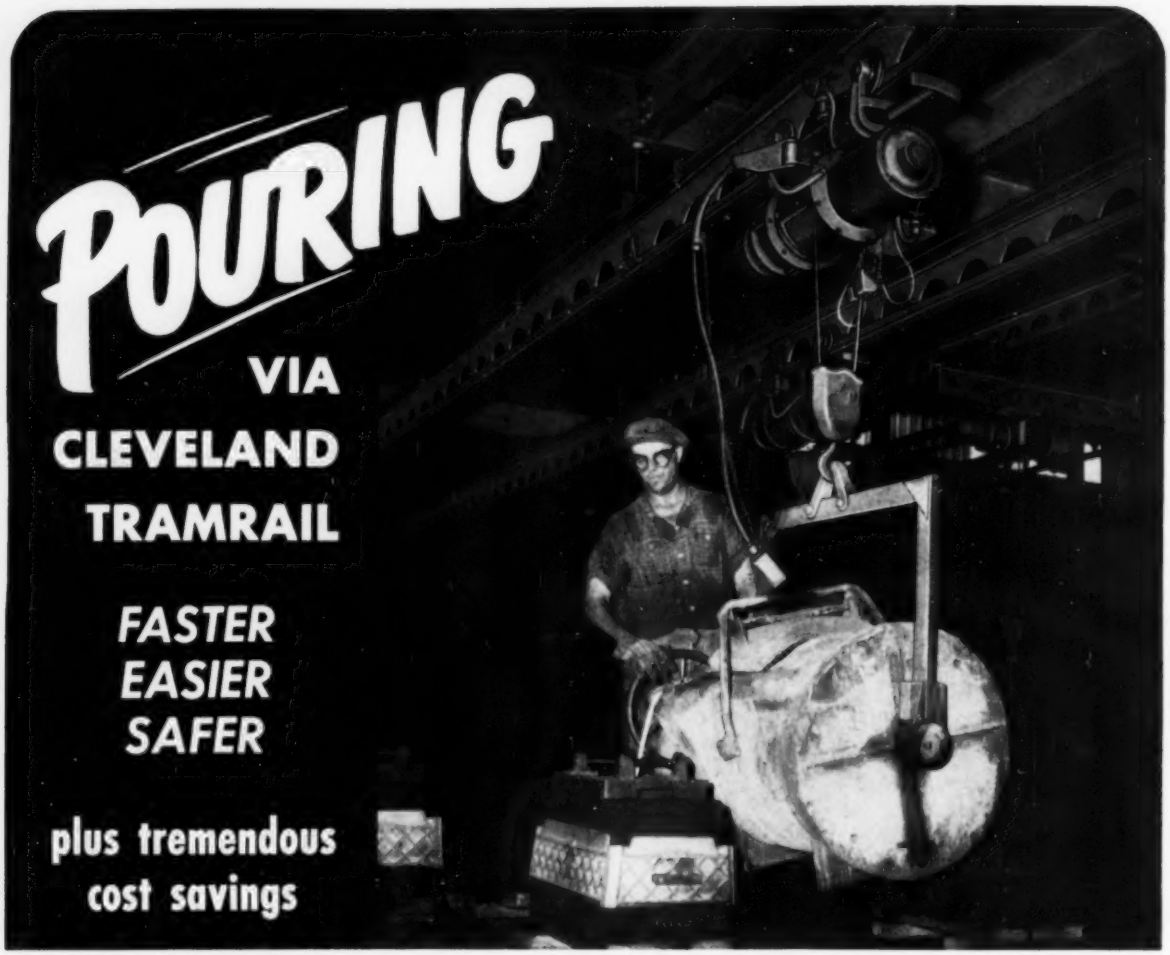


Seldom does new equipment installed in a plant pay for itself as quickly as Cleveland Tramrail in foundries. Whether in a gray iron, steel, or non-ferrous foundry, the advantages of Cleveland Tramrail are so great that the original capital expenditure is usually returned by the equipment in one year.

Pouring hot metal is one of the many important foundry jobs which overhead Tramrail makes faster, easier, safer. In addition, heat loss is drastically reduced because the metal can be conveyed directly from cupola to mould via Tramrail in considerably less time. Large unit amounts of metal can be handled per trip and need of transferring to smaller pouring ladles is obviated.

The same overhead Tramrail trackage, bridges, carriers, and hoists can also be used for all other foundry handling. Sand, delicate moulds, patterns, and castings can be transported quickly by Tramrail without interference with floor obstacles and traffic.

Let us show you what other foundries—hundreds of them—have accomplished with Cleveland Tramrail. Then you can settle in your mind whether this offers real possibilities for you too.

GET THIS BOOK!

BOOKLET No. 2008. Packed with valuable information. Profusely illustrated. Write for free copy

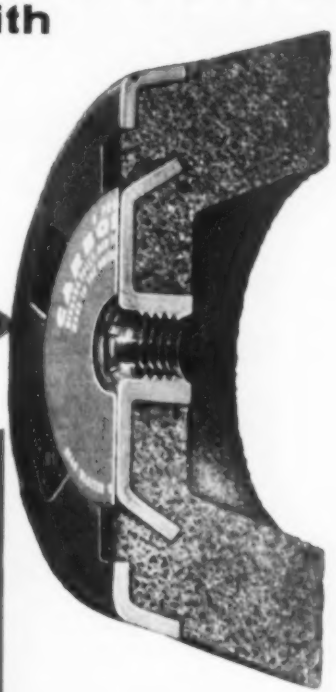
CLEVELAND TRAMRAIL DIVISION
THE CLEVELAND CRANE & ENGINEERING CO.
3830 East 286th Street, Wickliffe, Ohio

CLEVELAND TRAMRAIL
OVERHEAD MATERIALS HANDLING EQUIPMENT

Circle 591 on Page 85

new development for rough grinding applications... the cup wheel with

"built-in guard"



- extra strong
- break-resistant
- positive mounting
- no work interference

Here's a new, portable cup wheel by CARBORUNDUM that offers outstanding safety and performance features for all rough grinding applications in steel mills, foundries, welding shops, etc. The "built-in" guard consists of a one-piece combination steel back and prong-type bushing molded into the fast-cutting resinoid bond. It is easy to mount, eliminates heavy conventional safety guards, and does not interfere with the work piece.

CARBORUNDUM
REGISTERED TRADE MARK

Send for more information **TODAY** →

THE CARBORUNDUM COMPANY
Bonded Abrasives Division, Dept. 81-92
Niagara Falls, New York

Please send me Form A-1523 which tells me about Cup Wheels with "Built-In" Guard.

Name _____ Title _____

Company _____

Address _____

City _____ Zone _____ State _____

81-92

Circle 592 on Page 85

are no problem with a

A Cleveland Vibrator keeps bulk materials flowing freely from any type of bin. Constant shaking breaks-up arches and jams before they start. You save time, and your bins are not damaged by hammering.

AIR ELECTRIC

Cleveland Vibrators are low in initial cost and inexpensive to operate. Cleveland manufactures both air and electrically operated vibrators. Either type will do the job; pick the one that fits best in your plant.

Write today for complete literature and prices.

Dept. 8H-2788 Clinton Ave.
Cleveland 13, Ohio

Circle 593 on Page 85

Readers' Comment

Telling the Foundry Story

To The Editors:

Mail gets here slowly and yesterday I read George Dreher's article, "Marketing Is Common Sense," in the April issue of Foundry.

There are a number of things in it which I like very much, particularly the emphasis on being alert to technological change. By this time I have had contact with quite a number of industries and I do not believe that the foundry industry leads the procession in this matter of sensing the trend of the new technologies. The article says the right things at the right time.

Another good point it makes is that the foundry story should be told to development and design engineers. I have heard a lot of very good papers and addresses before foundry societies which should have been presented before the American Society of Mechanical Engineers, the National Machine Tool Builders' Association and the like.

It's much like the American businessman who tells his side of the labor question mostly to his fellows in fancy clubs and such like. The union guys are smarter; they tell *their* story to the public.

C. J. Freund

25C Gulberg
Lahore
West Pakistan

C. J. Freund is Dean of the School of Engineering, University of Detroit. He currently is on leave to serve with the Pakistan Education Programs, University of Oklahoma, under sponsorship of the Ford Foundation.

Tribute to Dr. Ries

To The Editors:

In the May issue of Foundry, page 176, H. E. Henderson pays a much warranted tribute to the late Dr. Heinrich Ries. The undersigned would like to underscore what Mr. Henderson said about Dr. Ries being a gentleman.

From 1943 to 1947 I had the privilege of serving as the American Foundrymen's Society research fellow at Cornell University in Ithaca, N. Y. Here Dr. Ries lived and was emeritus professor of geology. I spent many an hour with him in his living room discussing many topics, some of which were related to foundry sands. It was in this room that I learned much about Mr. Henderson, "The Sandman," whom even today I do not believe I have had the privilege of meeting.

Dr. Ries and I did not always see eye-to-eye about sand problems, but he was always the gentleman to whom Mr. Henderson refers.

Dr. Ries did one thing which has become so important to this writer. He provided me with a knowledge of the heritage regarding foundry sands which is invaluable. If I can, in some small manner, pass on this heritage to students with whom I come in contact, I hope such students will realize that it stems from my association with Dr. Ries—the gentleman.

Douglas C. Williams
Associate Professor

Dept. of Metallurgical Engineering
The Ohio State University
Columbus, Ohio

Should Be Studied

To The Editors:

The foundry industry owes you a vote of thanks for the excellent editorials that you have been publishing in the Foundry magazine. They all deal with subject matters that must and should be studied by all foundrymen.

Keep up the good work.

Harry W. Dietert

Harry W. Dietert Co.
Detroit 4, Mich.

Profilometer Not Used

To The Editors:

The June 1959 issue of Foundry magazine, Page 212, contains the abstract of the technical paper, "Evaluation of Cast Surfaces for Roughness Standards," presented at the Chicago meeting of AFS.

One point was abstracted in error which is of such importance that I believe it should be called to your attention. Your statement: "These

New SPECIALIZED

Harbison-Walker Refractories meet the intensified conditions of today's aluminum industry

Within the last couple decades the production of aluminum metal in the United States has trebled and the number of its alloys has increased manyfold. Rapid evolutionary developments created the need for refractories to meet new conditions. The severity of corrosion, more destructive impact accompanying furnace charging and the necessity of avoiding contaminants for meeting rigid alloy specifications—these among other factors have become increasingly important.

Since the first commercial production of aluminum and its alloys, Harbison-Walker brands, primarily of alumina-silica and high-alumina compositions, have continued to fulfill the ever-growing demands. Through unceasing research several refractories, recently developed specifically for aluminum melting furnaces, possess definitely superior properties for maximum durability and best quality of metal. Harbison-Walker's CORALITE XX (85% alumina brick) has established excellent service records in aluminum furnace bottoms and side walls. Several modifications with enhanced properties now are in commercial production.

These unique refractories expecially suited for aluminum melting furnaces are here briefly described.

CORALITE 22-58 is a stabilized aluminum phosphate bonded brick containing approximately 85% alumina. It has exceedingly high strength and withstands greater impact and abrasion. Its resistance to wetting and penetration by the molten metal are properties of paramount importance. CORALITE 24-59 is the hard-fired variation, having still higher mechanical strength.

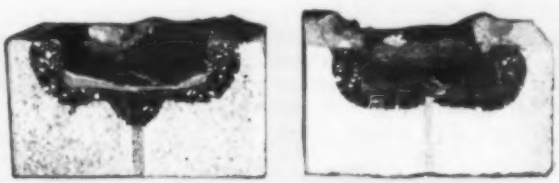
CORALITE 3-59 is a very hard-burned brick containing approximately 85% alumina. It is made with a special bond (patent pending) which contributes to its remarkable strength. As illustrated by the photograph showing results of the laboratory tests, it is exceedingly resistant to penetration and reaction with molten aluminum.

CORALBOND is a phosphate bonded high alumina mortar developed specifically for use in aluminum melting furnaces. Among numerous mortars of many compositions, CORALBOND is very outstanding in its resistance to penetration and corrosion by aluminum alloys at the furnace operating temperatures.

ALUMINUM IMMERSION TEST

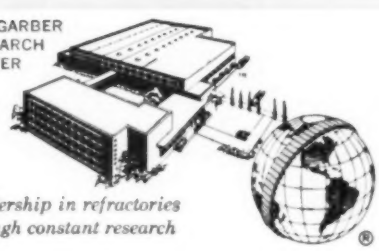
These brick, which were immersed in aluminum alloy at 1400°F. for nine days, show contrast in degree of penetration or wetting between a normal high alumina brick, left, and CORALITE 3-59, right.

MORTAR JOINT TEST



Photograph of Laboratory "Cup Tests" with molten aluminum alloy, shows striking difference in resistance to penetration and corrosion between a widely-used air-setting bonding mortar at the left and the CORALBOND joint at the right. Among many mortars of widely different compositions, CORALBOND—as illustrated in this test—is unmatched.

THE GARBER RESEARCH CENTER



Leadership in refractories through constant research

HARBISON-WALKER REFRACTORIES COMPANY

AND SUBSIDIARIES — GENERAL OFFICES: PITTSBURGH 22, PENNSYLVANIA

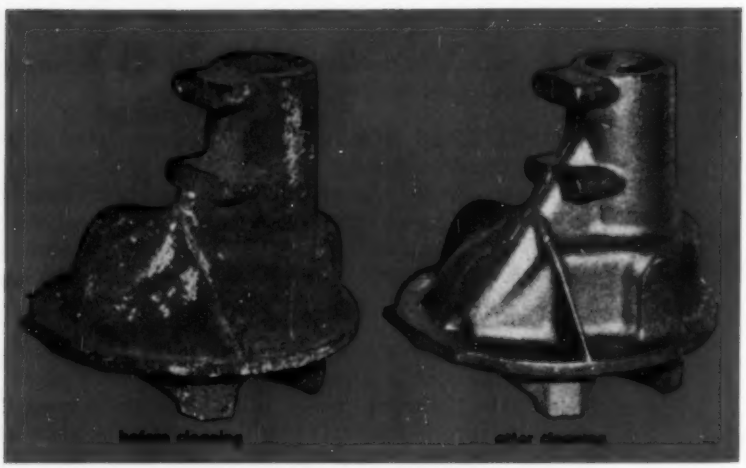
World's Most Complete Refractories Service

Circle 594 on Page 85

WHEELABRATOR® STEEL SHOT

cuts abrasive costs for

ALL TYPES OF FOUNDRIES



Malleable Foundry Saves $12,000 Annually

Cuts Abrasive Consumption in half

Savings of $1,000.00 a month in abrasive cost are being made at Albion Malleable Iron Co., as a result of switching from a malleable type abrasive to Wheelabrator Steel Shot.

This foundry operates a battery of 8 Wheelabrator Tumblasts, cleaning a variety of regular and pearlitic malleable castings. Consumption of the malleable shot in these machines was at the rate of 20 tons a month. Since changing to Wheelabrator Steel Shot this has been decreased to 10 tons a month, for an annual saving of $12,000.00 on abrasive alone.

More than 1200 firms have standardized on Wheelabrator Steel Shot and are recording impressive savings. Consistently harder, with greater resistance to breakdown, it lasts longer in use, cleans better, and reduces total cleaning costs.

Write today for Bulletin 89-B — free — for detailed information on Wheelabrator Steel Shot

WHEELABRATOR
CORPORATION

505 South Byrkit Street **Mishawaka, Indiana**

Canadian Offices: Scarborough (Toronto) – Montreal

World's largest manufacturer of airless blast cleaning and steel abrasives.

gages can be checked with a profilometer" is incorrect. Our experience has been that profilometer readings have too much latitude to use them to establish a gage.

Some value may be realized using this machine for comparison of two surfaces. However, several readings on each surface are required. The photomicrograph method, or a machine which graphs the actual surface (Talysurf or Perth-o-meter), are the only methods we have found reliable.

ELDON SWING
Producibility Casting Engineer
Boeing Airplane Co.
Wichita 1, Kans.

Applying an Abrasive Face

TO THE EDITORS:

In the February, 1959, issue of FOUNDRY, "Questions and Answers" department, page 98 under "Abrasive Face on Castings," you state:

"Then apply a uniform layer of the abrasive, using a screen of the same mesh as the abrasive. Print or stamp-back the pattern to obtain a smooth or level surface."

1. If you print the pattern back after the abrasive is applied, you force the abrasive into the sand. If the abrasive is forced into the sand the metal cannot fuse and surround the abrasive and hold it secure.

2. A smooth surface is not needed.

As you have been asked this question many times and gave answers that must have embarrassed you if tried, kindly accept my method which follows:

1. Mold the same as any green sand casting, including gating and risering.

2. Shake on dry china clay No. 41 through a parting bag. Cover surface completely so that no black sand is showing.

3. Sprinkle abrasive through a sieve, proper size.

4. Spray on Glutrin, not diluted, enough to dampen the clay.

5. Do not dry mold.

6. Close mold and pour hot.

7. For aluminum, use 10-in. high pouring and riser boxes for pressure.

8. Thickness of metal—cast iron $\frac{1}{8}$ in., bronze and aluminum $\frac{1}{4}$ in.

All stages require "trial and error" before perfection is acquired.

GEORGE STAUB
Massapequa, L. I., N. Y.

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Circle 596 on Page 85

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Some Lose Out

Every other year, publication of *Penton's Foundry List*, our census of foundries in the United States and Canada, permits FOUNDRY to present considerable interesting and valuable information on the geographical distribution, products, and production processes of foundries (Page 62).

Publication of these data provides the basis for much discussion on the health and future of the foundry industry. Statistical information gleaned from the 1959-60 edition of PFL should be no exception.

Many persons in the foundry and allied industries will be concerned because the new census shows 235 fewer foundries today than two years ago. The trend toward a smaller number of foundries continues. Production statistics and information on new foundries and mechanization and modernization of existing plants show, however, that productive capacity of the foundry industry has not been affected by these losses. The industry probably is capable of producing a greater tonnage of castings yearly than at the end of World War II.

The question naturally arises, "Why do many of these foundries go out of business?"

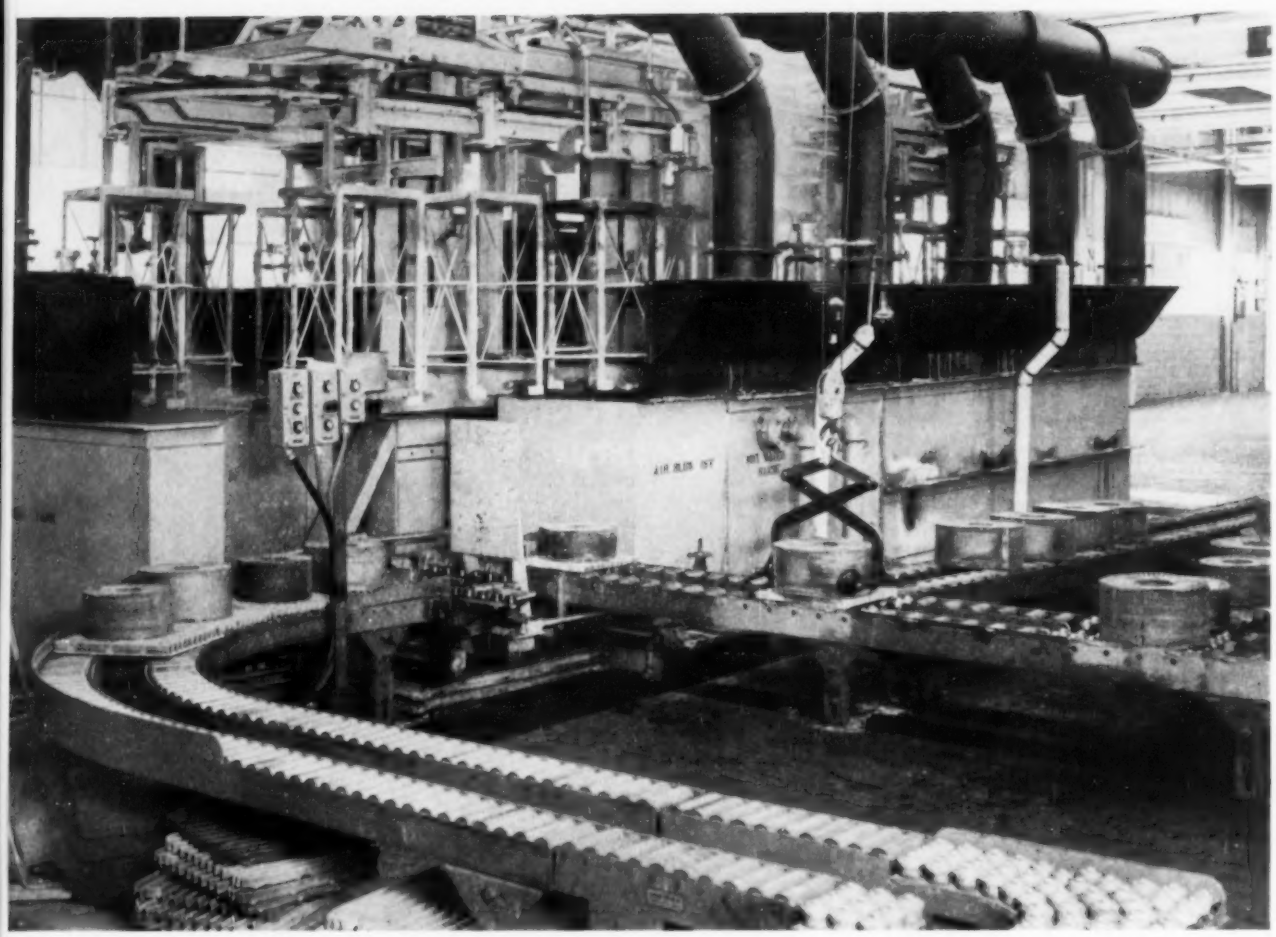
Many good reasons may be related to the financial structure of the individual units of the industry and the type of operation. As studies of failures in other types of commercial organizations have shown, however, poor management probably is the major cause of foundry failures. Too often management lacks the ability to handle adequately the many problems of modern industry. These difficulties relate to production, pricing, marketing, labor relations, and many other areas.

Obsolete plants created by top management inattention and, in some instances, a weak pricing situation among commercial foundries have caused some companies to discontinue captive shops and to purchase their castings from jobbing plants. Finally, a few foundry owners who were tired of working have considered liquidation the most satisfactory way to leave the industry.

The moral of the 1959 PFL census figures seems plain. Unless present management does a better job and unless good men are being trained to lead these organizations, the study two years from now again will show fewer foundries making more castings.

What kind of management training program do you have?

Frank G. Steinebach
Editor

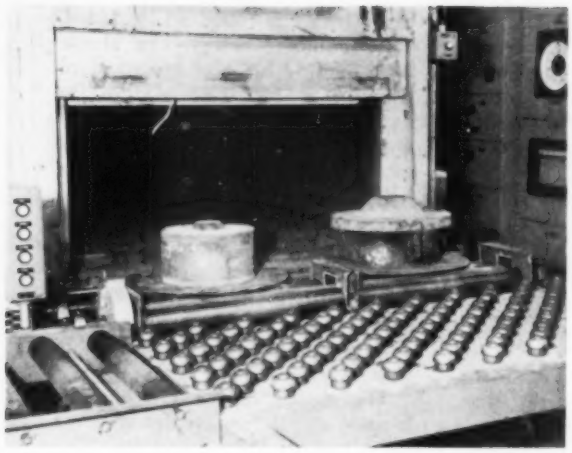


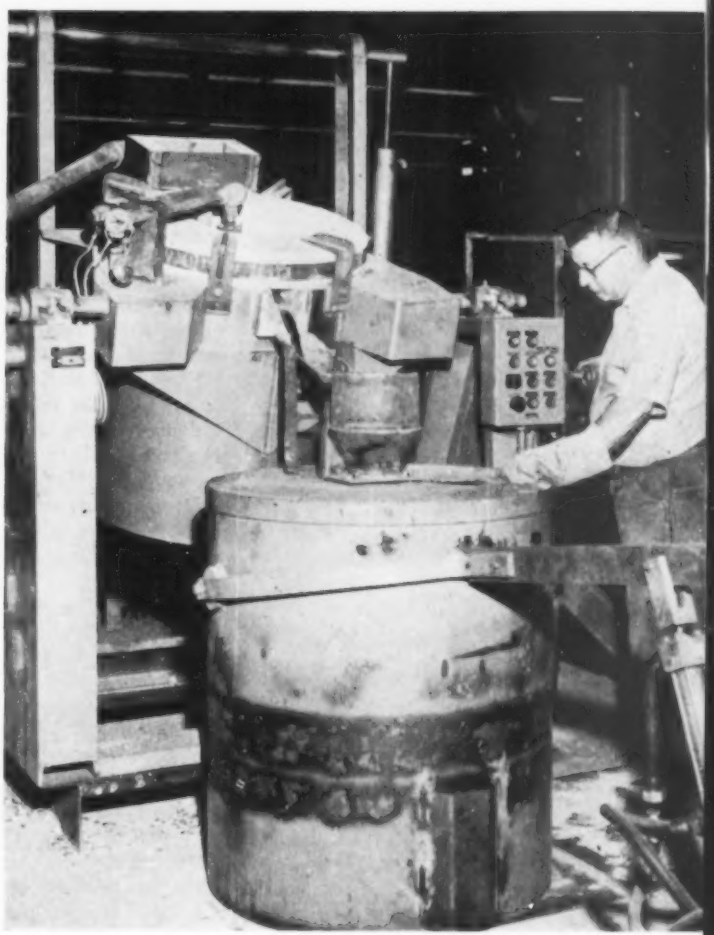
Rotor Bodies for

MOTORS CAST CENTRIFUGALLY

Preparing and casting rotor bodies is an intricate operation. The most critical factor in casting is temperature of the rotor bodies, top and bottom molds, and the aluminum used to cast the windings

By W. S. ATKINSON
Small AC Motor & Generator Dept.
General Electric Co.
Schenectady, N. Y.





Rotor bodies are delivered to preheat ovens. Oven controls, at left, consist of a series of relays, timers, and limit switches

After they have been automatically picked up from the conveyor, rotor bodies are shuttled through the series of processing tanks

Furnaces are standard tilting type, modified to fit concept of pouring the molten aluminum directly into the rotor casting molds

● After extensive studies, the Small AC Motor and Generator Dept., General Electric Co., Schenectady, N. Y., decided to centrifugally cast the bars, end-rings, and fan blades in rotor bodies of certain motors. These rotors are part of recently redesigned 30 to 125 hp induction motors produced in a new mechanized facility.

Preparing and casting the rotor bodies is an intricate operation. Inside walls of the winding slots (in the rotor laminations) and the outside surface of the rotor bodies must be completely insulated. The pure aluminum must not come in contact with the rotor's steel laminations.

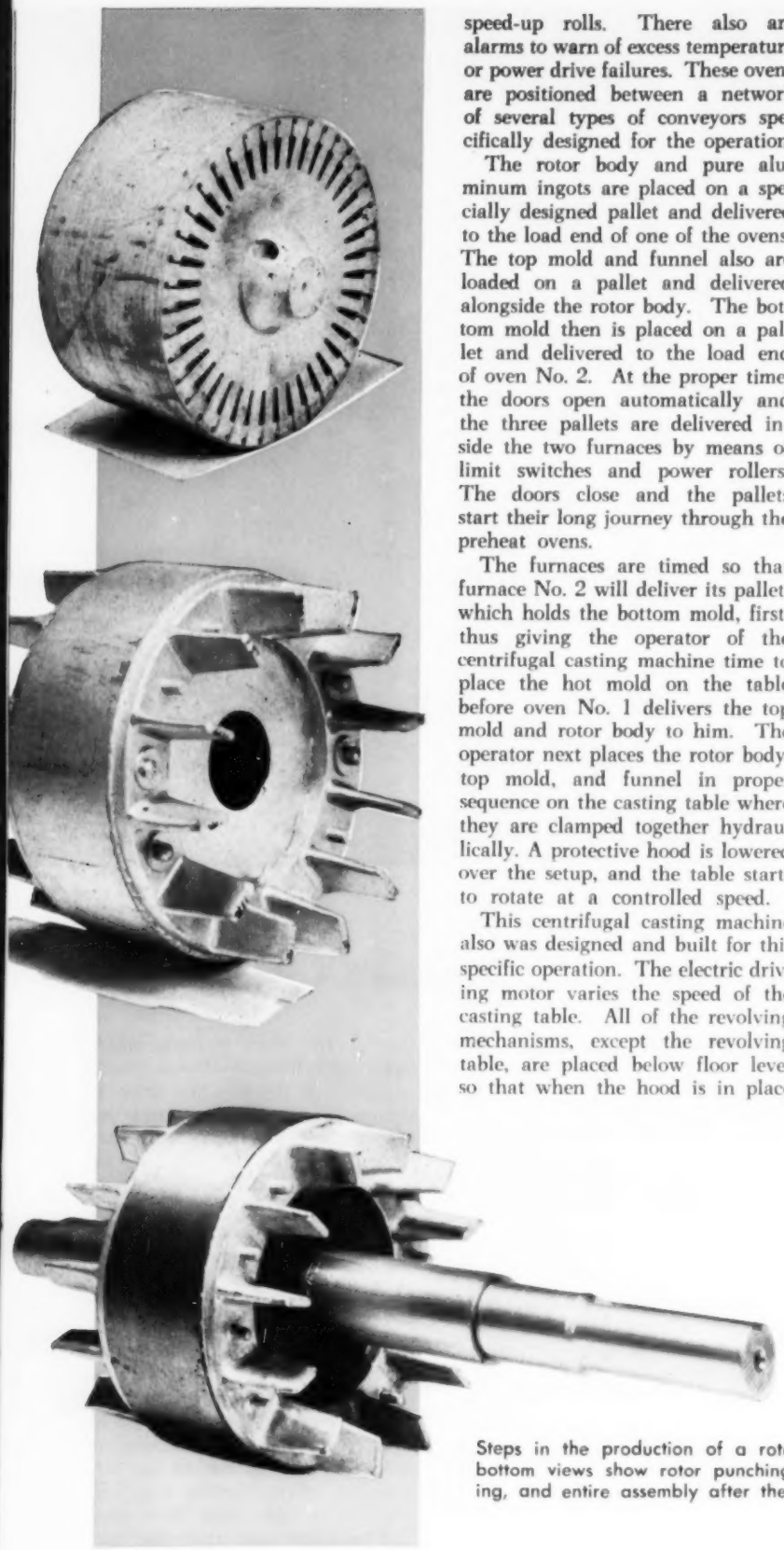
The most critical item in casting is the temperatures of the rotor bodies, top and bottom molds, and aluminum used to cast the windings. If any of the temperatures varies out of range, it will cause open bars in the rotor slots, or voids in the end rings, and/or hollow or incomplete fan blades. Any of these defects would cause the rotor body to be scrapped.

Casting Preparations—The rotor bodies are delivered automatically by power and free roller conveyors from the annealing furnace to the slot insulating coating facilities. This coating equipment was designed and built specifically for our purpose. It consists of a series of carriages mounted on a monorail directly over the cleaning and coating tanks.

The rotor bodies are picked up automatically from the conveyors by the carriages and then shuttled through the series of tanks where the rotor bodies are cleaned, rinsed, pickled, and rinsed again prior to slot insulating. After the insulating of the slots, the bodies again are rinsed. At this final station, excess moisture is blown off with air.

The rotor bodies then are discharged automatically and delivered to the putty station for further processing. In this operation, a center plug is placed into the shaft hole of the rotor bodies and held in place with putty. The rotor bodies finally are delivered by a conveyor to the preheat ovens.

Preheating—Facilities required for this operation are two air-circulated ovens. Oven controls consist of a series of relays, timers, and limit switches to open and close doors and energize and stop the oven



speed-up rolls. There also are alarms to warn of excess temperature or power drive failures. These ovens are positioned between a network of several types of conveyors specifically designed for the operation.

The rotor body and pure aluminum ingots are placed on a specially designed pallet and delivered to the load end of one of the ovens. The top mold and funnel also are loaded on a pallet and delivered alongside the rotor body. The bottom mold then is placed on a pallet and delivered to the load end of oven No. 2. At the proper time, the doors open automatically and the three pallets are delivered inside the two furnaces by means of limit switches and power rollers. The doors close and the pallets start their long journey through the preheat ovens.

The furnaces are timed so that furnace No. 2 will deliver its pallet, which holds the bottom mold, first, thus giving the operator of the centrifugal casting machine time to place the hot mold on the table before oven No. 1 delivers the top mold and rotor body to him. The operator next places the rotor body, top mold, and funnel in proper sequence on the casting table where they are clamped together hydraulically. A protective hood is lowered over the setup, and the table starts to rotate at a controlled speed.

This centrifugal casting machine also was designed and built for this specific operation. The electric driving motor varies the speed of the casting table. All of the revolving mechanisms, except the revolving table, are placed below floor level so that when the hood is in place the machine is completely guarded.

Aluminum Melting—The aluminum melting furnaces are standard tilting type but were modified to fit our concept of pouring the molten aluminum directly into the rotor casting molds, instead of using a ladle to transfer metal from the furnace to the casting machine. After the proper amount of pure molten aluminum is poured into the mold, the furnace is returned hydraulically to its normal position. Temperature of the aluminum is very critical at this point.

The casting machine is allowed to spin, at a controlled speed, until the aluminum has solidified. The metal forms the bars and end rings, and holds the slot bars in proper position. The cast fan blades are provided to circulate air inside the motor.

After the melting furnace is returned to its normal position, the aluminum ingots which were preheated with the molds and rotor bodies in the large preheat ovens are loaded into the furnace crucible. Preheating the aluminum is a safety measure to prevent introduction of moisture into the molten metal, thereby eliminating an explosion hazard and curtailing gas absorption.

When the casting machine table stops revolving, the protective hood is raised and automatically rotated out of position. The top and bottom molds then are disassembled from the rotor body and returned by conveyors to the load or front end of the preheat ovens to repeat the cycle.

The rotor body is placed on a specially designed conveyor and transported automatically to a station for the final operation of cutting the gates, removing surplus aluminum, and withdrawing the plug which was put in the shaft hole before the casting operation. The completed rotor body then is placed in storage for later assembly in a motor.

● For an extra copy of this article, until supply is exhausted, use card on Page 85

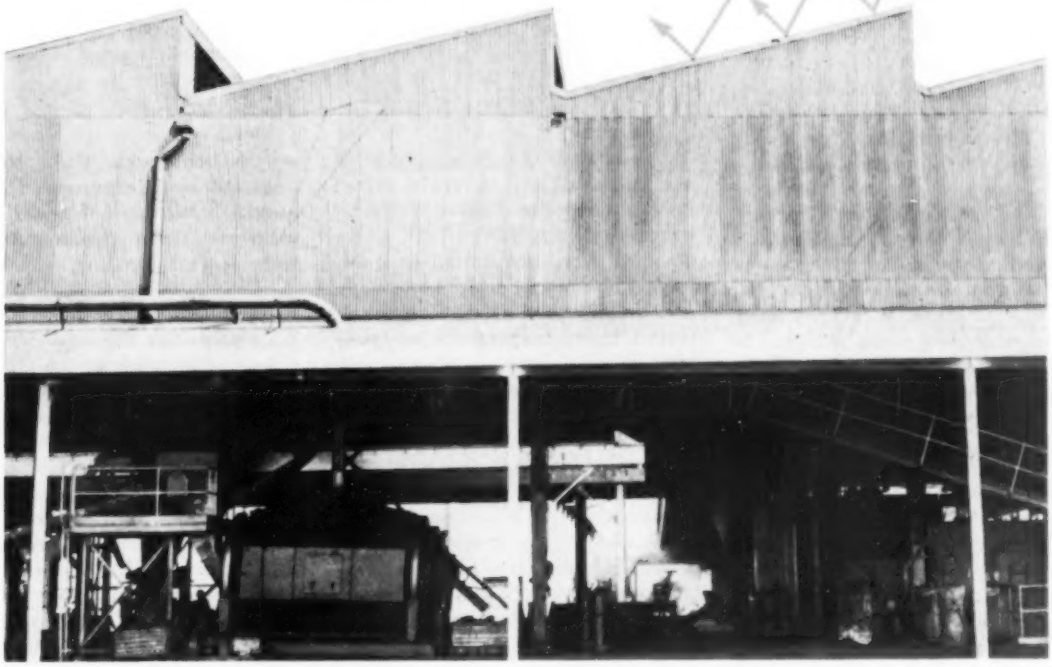
Steps in the production of a rotor body for electric motor. Top to bottom views show rotor punchings prior to casting, rotor after casting, and entire assembly after the shaft has been integrated

Design Can Influence

FOUNDRY COOLING

High heat loads ordinarily rule out conventional cooling methods in a foundry. Temperature control is primarily a question of ventilation —putting air in motion either naturally or artificially

By H. E. KNOWLES
Formerly *Plant Engineer*
National Malleable & Steel Castings Co.
Phoenix, Ariz.



Side walls of the main building drop to 14 ft above the flood datum. This open wall construction leaves an open path for natural cross ventilation

● The problem of cooling a foundry is unique in that, generally, its high heat loads rule out conventional cooling methods. Smoke control also may necessitate the movement of large quantities of air.

Because the cost of artificially cooling this air would be prohibitive, temperature control in a foundry becomes primarily a question of ventilation—putting air in motion by either natural or artificial means.

There is no cure-all for existing installations since each application has its own inherent conditions. Plant layout, building design, and type of melting and pouring operations—all influence the decision as to the best means of ventilation. On the other hand, it is possible in designing a new foundry to take advantage of certain natural factors affecting the cooling. This article will describe briefly the construction of the Capitol Foundry Div. plant of the National Malleable & Steel Castings Co. and how it has been tailored to utilize these factors. (This foundry's operations were described in FOUNDRY, September, 1957. See Page 112.—Editor)

Capitol Foundry is situated near Phoenix, Ariz., where summertime shade temperatures reach a peak of 120° F. Relative humidity ranges between 10 and 30 per cent. Because of the low humidity, the body's natural evaporative cooling system needs merely a movement of air to maintain personnel comfort. To obtain this ventilation at least possible cost meant that natural conditions should be utilized as efficiently as possible.

Temperature Regulators — Three

Aerial view facing east shows foundry layout. Main building is of structural corrugated sheet steel construction, with about 4 acres under roof. It surrounds a 200 x 300-ft quadrangle

factors which affect plant heating are 1) topographical locations, 2) prevailing wind and normal air currents, and 3) exposure to sun. The topographical location should be selected carefully with two points in mind. First, the site should be surrounded by flat terrain with a minimum of outlying building structures to insure an unimpeded flow of air. Second, in areas of concentrated sun exposure, any mass, whether it be a mountain or a building, tends to reradiate absorbed heat. Consequently, any plant site should be located away from such masses.

Prevailing wind and air currents should be investigated closely because they will supply the bulk of the plant's natural cooling. Once determined, the foundry departments with high heat concentration should be situated to receive the wind masses. Further, the design of the foundry buildings (walls, roof structures, etc.) will in a large part be affected by the wind direction.

It should be remembered that air currents, although not always caused by the same natural phenomena that produce winds, may be a very important factor in airbound localities. These currents differ from wind in that they are generally vertical up-drafts and are caused by cool air masses replacing rising hot air. The foundry itself is a producer of such air currents, although more natural sources are bodies of water, irrigated fields, etc.

Climatic conditions will determine the orientation of the plant from the standpoint of both sun exposure and the possibility of rain damage. In addition, the lighter building structures which do not have to be designed for conventional snow loads mean less heat absorption and simplify wall support design to permit larger opening for air passage.

Influencing Factors—Three factors determined to a great degree the design and orientation of the Phoenix plant's foundry buildings. First, the plant site is on flat land, with the nearest mountain about 4 miles away. No structures of appreciable size are within miles of the site. Second, the prevailing wind in this area is from the southwest. Consequently, the foundry bays extend from east to west, permitting ventilation across them. The melting bay, on the east side of the plant, runs north and south, and the prevailing wind carries heat away from the rest of the plant. Third, since the sun shines there almost 95 per cent of the time and there are only two short rainy seasons a year, the simplest type of building structure with open side walls can be utilized.

The problem of designing-in the cooling became an application of combining the natural factors at our disposal with artificial cooling where practical.

The main foundry building is of structural corrugated sheet steel construction, with about 4 acres under roof. It surrounds a quadrangle measuring 200 by 300 ft, on which is situated a reinforced concrete service building, 137 x 184 ft. This building houses the maintenance and pattern shops, stores, laboratory, and all shop offices. All offices of the service building are air cooled, the pattern shop and laboratory are serviced with evaporative coolers, and the remainder of the building is cooled by high-bay ventilating fans.

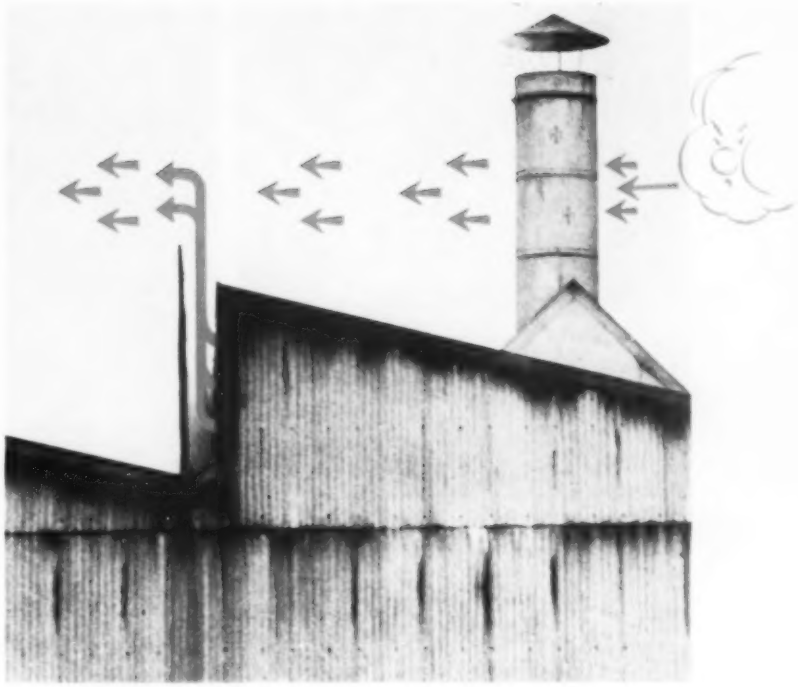
Open Side Walls—The foundry lends itself more to creative designed-in cooling. There is no glass in the main plant structure. Side walls of the main building drop to 14 ft above the flood datum in all instances, except in small storage areas and where equipment might suffer water damage from the very infrequent rainstorms. The open side wall construction leaves a path for natural cross ventilation. At the same time it renders roof ventilators impractical because the air velocity created by such fans is low compared with cross wind velocities.

The roof is of saw tooth design, with large open louvers in the vertical faces. To take advantage of all types of natural ventilation, on still days the air currents or up-drafts are given a natural path through open louvers.

Another design which we have tried experimentally with some small

degree of success consists of utilizing the wind to produce air currents. A wall is placed parallel to and about 12 in. away from the vertical louvered panel. Wind passing over it creates the effect of an air pump, and the resulting vacuum tends to draw hot air out of the building. This design was applied to the melting bay because its location on the east side of the plant does not permit a direct flow of the prevailing winds through it. The disadvantage to this method of inducing draft is, of course, that it is effective only when the wind is blowing in a given direction.

Heat absorption from the sun is controlled somewhat by reflective galvanized corrugated panelling. Critical structural members and steel panels have been painted aluminum. Painting has proved most effective on electrical panel boards which are exposed to the sun; previously, the dark finish of the steel absorbed enough heat to necessitate uprating starter box overload relays during the summer. Surface storage tanks for water, core oil, etc., have been treated similarly.



Wind fence produces air currents. Wind passing over it creates the effect of an air pump with the resulting vacuum drawing out hot air

Supplementary Ventilation—Even with the best designs, as in any foundry, certain heat load centers require spot cooling. The Phoenix plant is no exception. Many fans and ventilators are used at pouring stations and on the melting platforms. Again, the open walls assist use of this equipment in that sources of fresh and dry air are readily available. In addition, some secondary ventilation is derived from the fans and blowers used for smoke control, ovens, dust collectors, etc.

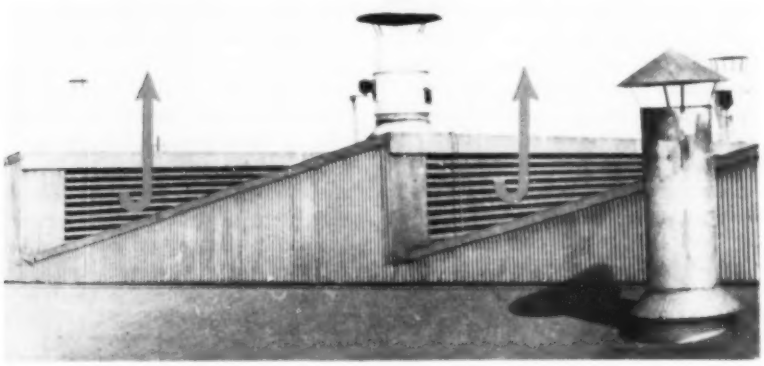
Fortunately, this open type of building design presents no great heating problem with the mild Arizona winters. Salamanders are required in certain areas for personnel comfort but fuel cost is slight. It was found necessary, however, to install an 8-ft wall along the west side of the finishing department; it helps to keep this area warmer, but its original purpose was to reduce the number of eye injuries caused by foreign matter blown by the wind.

Has Applications—This design is well suited to the Southwest, but there could be applications in certain northern areas. Although the design is based on an open location for free air flow, with the trend toward decentralization and suburban industrialization, this may not present a problem.

A more important difficulty would be the efficient conversion of the open side wall construction to closed walls for winter protection. The system would have to be airtight and may pose a problem in providing heating and other service facilities at the most effective locations.

Although this type of building design is unique, even for the Southwest, it has proved itself by weathering five blistering Arizona summers with not one day of lost production due to excessive heat.

Roof has louvered sawtooth design and conventional roof ventilators. Air currents or updrafts are given natural path through open louvers



This article was published originally in *Steel Foundry Facts*, a publication of Steel Founders' Society of America.

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Fig. 1—Photomicrograph of an as-cast sample. Picral etch, 1000 X

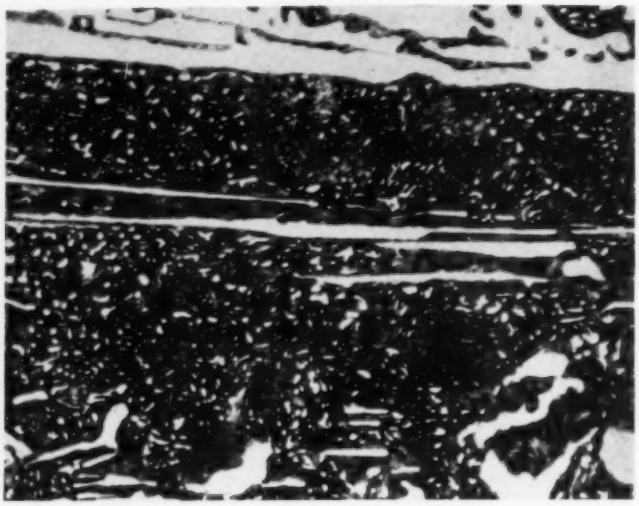

Fig. 2—Photomicrograph of sample annealed at 800° C for 20 min. Picral etch, 1000 X

The Mechanism of Graphitization of Fe-C-Si Alloys

After precipitation, secondary carbides grow, deriving carbon from the dissolution of primary cementite in austenite, then decompose into temper carbon and carbon-depleted austenite

By D. S. GILL and D. S. EPPELSHEIMER
School of Mines and Metallurgy
University of Missouri, Rolla, Mo.

● THE MECHANISM of first-stage graphitization in malleablizing was thought to be well explained until the publication of a paper by Taub,[1] who differed with the accepted theory that temper carbon precipitates directly from the supersaturated austenite.

With the help of a few micrographs, he proposed that secondary globular carbides precipitate from the austenite which later decompose into temper carbon and carbon-depleted austenite. Keeping these observations in view, experiments were conducted to study the early stages of graphitization.

An iron-carbon-silicon alloy of 2.45 C and 1.45 Si was prepared in a high-frequency induction furnace, using Armco iron, high-grade ferrosilicon (80 per cent Si), and electrode carbon.

Specimens Plated — Dilatometer specimens 5 mm in diameter and 25 mm long were prepared from this alloy. They were chromium-plated to avoid oxidation and decarburization. The microstructure of an as-cast dilatometer specimen is shown in Fig. 1. The specimens were annealed at various temperatures (800 to 925° C) by placing them in an optical differential dilatometer and moving the already hot furnace over the specimens. The required temperature was attained in a few minutes. Specimens were held at various temperatures for different periods of time, and then were water quenched. The change in length of the specimens

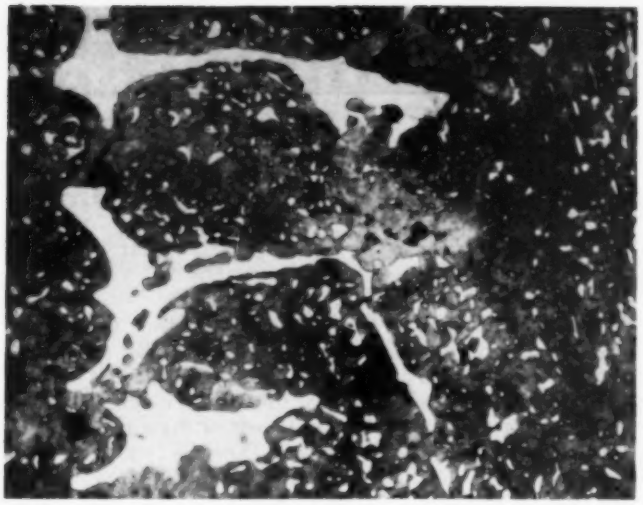

Fig. 3—Photomicrograph of sample annealed at 800° C for 80 min. Picral etch, 1000 X

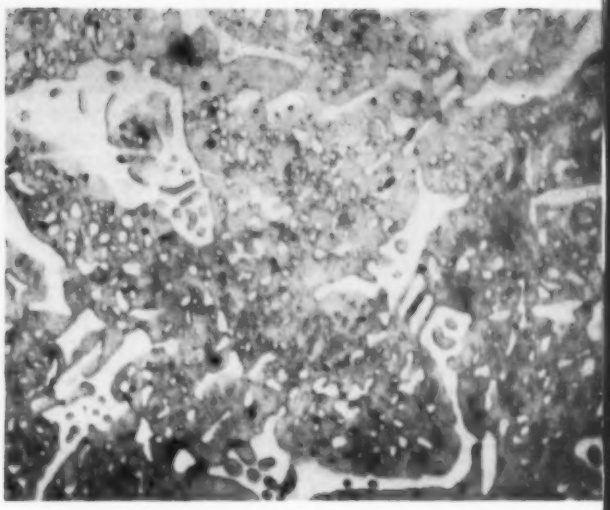

Fig. 4—Photomicrograph of sample annealed at 800° C for 160 min. Picral etch, 1000 X

was noted, and it was assumed to be proportional to the degree of graphitization.

Some specimens were removed from the furnace during the incubation period (when no change in length is noticed) to study the effect of annealing on the microstructure during this period. The specimens were fractured and transverse sections were prepared for microscopic examination.

Stages of Nucleation — Several steps in the nucleation and growth of temper carbon nodules were observed. The first step is the precipitation of secondary globular carbides (Fig. 2). The precipitation of secondary carbides occurs during the early period of annealing. In the second step, Fig. 3 and 4, these secondary carbides grow and attain a maximum equilibrium size. The rate of growth is greater and the equilibrium size attained is larger at higher temperatures. The secondary carbides attain the maximum size within the incubation period.

It was observed that for short periods of annealing times, certain areas etched darker than the rest of the matrix (Fig. 3). Most of these dark areas were found to be around the secondary carbides. During this period, no expansion of the specimen was noticed, indicating that no graphitization apparently had taken place. This may be attributed to the precipitation of submicroscopic amounts of carbon which is coherent with the secondary carbide lattice.

It also was observed that the amount of primary cementite decreased during the precipitation and growth of secondary carbides (Fig. 1 to 4). It is, therefore, apparent that secondary carbides derive their carbon from the dissolution of primary cementite in austenite.

Third Step—In the third step, Fig. 4, the secondary carbides decompose into temper carbon and carbon-depleted austenite. The graphite nuclei thus formed are at the secondary carbide-austenite interface. The early workers[2, 3] assumed the austenite-primary cementite interface to be the site of graphite nuclei formation and thus failed to account for some of the graphite nodules found in the austenite grains. The formation of most of the graphite nodules near the austenite-cementite interface may be due to the high concentration of carbon in this area; it results in faster rate of precipitation and growth of secondary carbides in this region.

The activation energy of growth of secondary carbides has been calculated, using the analytical expression given by Zener[4] for the growth of spherical precipitate in a matrix as modified by Brown and Hawkes.[3] The calculated value is 27,000 cal/mole, which is in fair agreement with the value of 23,000 cal/mole obtained by extrapolating the results of Wells, Batz, and Mehl[5] for the diffusion of carbon through austenite. The preceding observation suggests that carbon diffusion is the rate-controlling factor in the growth of secondary carbides.

Acknowledgment — The authors wish to thank R. W. Geehan, chief, Division of Mineral Technology, Region IV, and J. A. Rowland, chief, Branch of Metallurgy, Division of Mineral Technology, Region IV, U. S. Bureau of Mines, Rolla, Mo., for their assistance in the preparation of the dilatometer specimens which were used in this investigation.

This article is from a thesis submitted in partial requirement for the degree of M.S. in Metallurgical Engineering, University of Missouri, School of Mines and Metallurgy, 1959.

REFERENCES

1. A. Taub, "The Mechanism of Graphitization," FOUNDRY, October, 1958, p. 82.
2. H. A. Schwartz, "Nucleation of Graphite by Manganese Sulphide," *Metals and Alloys*, vol. 6, 1935, p. 328.
3. B. F. Brown and M. F. Hawkes, "Kinetics of Graphitization of Cast Iron, *Transactions*, AFS, vol. 59, 1951, p. 181.
4. C. Zener, "Theory of Growth of Spherical Precipitates from Solid Solutions," *Journal of Applied Physics*, vol. 20, 1949, p. 950.
5. C. Wells, W. Batz and R. F. Mehl, "Diffusion Coefficient of Carbon in Austenite," *Transactions*, AIME, vol. 188, 1950, p. 553.

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6085 Foundries

. . . Their Products, Processes, and Location

● THE United States and Canada have 6085 foundries, 235 fewer than were in operation two years ago. These figures were compiled by FOUNDRY in its biennial census of the industry, data from which are incorporated in a new edition of *Penton's Foundry List*, published by the Penton Publishing Co., Cleveland.

The study reveals a drop since 1957 of about 3 per cent in the number of plants in the United States to a total of 5573; in Canada the loss was nearly 10 per cent to a total of 512.

Figures below showing the geographical distribution of foundries refer to number of individual plants, not to number of companies. Because some foundries cast more than one type of metal, the data for "total foundries" do not represent the sum of the number of producers of each of these metals.

Ups and Downs—Trends the last two years in number of producers of different types of metals were mixed. There are fewer makers of gray iron, brass and bronze, and

Geographical Distribution of Foundries

	Total Foundries		Gray Iron Foundries		Malleable Foundries		Steel Foundries		Brass & Bronze Foundries		Aluminum Foundries		Magnesium Foundries		Zinc Foundries		Exclusive Nonferrous Foundries	
	1959	1957	1959	1957	1959	1957	1959	1957	1959	1957	1959	1957	1959	1957	1959	1957	1959	1957
Alabama	99	98	67	74	2	2	9	9	26	24	48	47	2	1	7	4	28	19
Arizona	11	11	4	6	..	..	2	3	7	7	7	8	1	..	4	3	5	3
Arkansas	24	28	9	10	..	..	1	1	7	9	16	19	..	..	4	5	14	17
California	543	562	113	121	4	4	49	46	221	217	363	375	44	35	110	120	393	405
Colorado	53	58	20	20	..	..	5	6	20	22	34	37	..	3	11	11	32	36
Connecticut	161	160	34	38	6	6	12	9	79	83	98	88	7	7	32	30	112	110
Delaware	8	8	2	2	1	1	3	3	4	4	3	3	..	..	..	1	3	3
Dist. of Col.	3	4	2	3	1	1	1	1	3	2	3	3	1	1	2	1	1	1
Florida	68	59	19	18	..	..	1	1	40	34	59	51	8	2	17	10	48	41
Georgia	65	69	38	44	..	..	4	4	24	26	35	36	1	1	2	3	24	21
Hawaii	4	..	3	..	..	..	1	..	3	..	4	..	..	..	1	..	1	..
Idaho	7	7	6	6	..	..	1	1	2	2	3	4	..	..	..	1	..	..
Illinois	478	485	136	150	16	15	35	32	150	157	262	263	22	14	110	98	304	306
Indiana	245	250	98	104	6	9	19	11	88	78	118	118	9	10	17	17	130	133
Iowa	81	79	46	48	1	1	1	2	21	21	36	36	3	2	10	10	33	29
Kansas	50	51	24	27	..	..	3	1	14	14	29	28	3	4	3	6	24	24
Kentucky	28	29	18	19	..	..	..	1	12	13	13	12	1	..	5	3	10	10
Louisiana	29	33	16	17	..	..	6	7	10	14	16	17	..	..	2	4	9	11
Maine	19	22	13	14	..	..	..	..	9	14	9	14	1	1	2	3	6	7
Maryland	35	41	15	19	1	1	1	2	18	18	22	19	4	3	3	7	19	20
Massachusetts	226	237	85	86	5	4	13	14	121	132	140	141	9	6	31	29	133	140
Michigan	434	455	141	148	8	8	33	30	135	146	204	203	30	28	100	100	264	277
Minnesota	95	98	46	47	1	1	6	8	30	36	47	48	5	5	15	14	43	42
Mississippi	13	14	9	10	..	..	..	..	6	6	7	9	..	..	1	..	4	4
Missouri	124	130	40	41	1	1	12	12	46	51	70	75	3	2	19	19	75	81
Montana	5	5	5	4	..	..	..	..	4	3	3	1	..	..	..	1	..	..
Nebraska	23	25	10	13	..	..	1	2	12	16	20	19	1	1	3	5	12	12
Nevada	1	1	1	1	..	..	1	1	1	1	1	1	..	..	..	..	..	..
New Hampshire	23	23	9	10	1	1	3	1	13	13	16	16	2	1	4	3	12	11
New Jersey	227	234	65	69	1	1	18	17	101	107	123	123	9	9	43	50	149	152
New Mexico	5	7	1	1	..	..	..	..	5	5	5	6	2	1	..	1	4	5
New York	418	433	121	142	6	7	30	32	194	218	245	254	14	29	87	76	266	264
North Carolina	65	64	48	51	..	..	..	..	40	37	47	47	2	..	4	1	17	14
North Dakota	3	4	3	3	..	..	..	..	..	1	3	3	..	..	..	..	..	..
Ohio	564	577	194	210	16	16	41	36	204	216	293	295	22	21	79	69	330	327
Oklahoma	49	53	19	25	..	..	1	2	25	22	34	30	..	2	6	4	29	27
Oregon	61	58	25	23	..	..	8	7	27	25	29	31	2	2	14	12	29	29
Pennsylvania	503	543	229	253	14	15	63	66	216	236	239	239	10	11	51	51	226	235
Rhode Island	50	40	11	10	2	1	1	..	19	16	21	20	3	2	12	10	38	28
South Carolina	22	22	18	17	..	..	1	1	17	19	17	19	..	1	1	..	4	6
South Dakota	4	4	3	3	..	..	..	..	2	1	3	2	..	..	..	..	1	..
Tennessee	72	78	53	55	..	..	2	3	27	31	34	32	3	1	8	5	19	23
Texas	171	168	72	69	2	1	18	16	82	82	109	103	6	4	32	28	88	86
Utah	16	17	13	14	..	..	2	1	8	6	6	6	..	..	1	..	3	3
Vermont	12	16	12	14	..	..	..	..	3	4	3	5	..	..	..	1	..	2
Virginia	47	51	37	42	..	..	4	4	29	31	28	31	2	1	6	4	10	9
Washington	71	73	32	34	1	1	17	18	37	40	44	45	4	3	15	14	32	31
West Virginia	30	31	14	16	1	1	2	2	14	17	9	11	..	..	1	1	13	12
Wisconsin	228	243	95	108	11	11	23	24	85	86	112	118	4	4	27	29	100	111
Wyoming	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Total U. S.	5,573	5,758	2,094	2,259	108	109	454	437	2,261	2,363	3,090	3,111	240	218	902	864	3,102	3,125
Alberta	24	..	14	..	..	..	3	..	12	..	15	..	..	..	3	..	10	..
British Columbia	49	..	23	..	2	..	7	..	26	..	27	..	1	..	6	..	23	..
Manitoba	20	..	13	..	..	..	2	..	6	..	9	..	..	..	3	..	6	..
New Brunswick	9	..	7	..	..	..	..	..	6	..	6	..	..	..	2	..	2	..
Nova Scotia	17	..	14	..	..	..	2	..	10	..	8	..	..	..	3	..	2	..
Ontario	247	..	119	..	11	..	17	..	114	..	135	..	7	..	33	..	111	..
Prince Edward Island	4	..	3	..	..	..	1	..	2	..	1	..	..	..	..	..	..	..
Quebec	131	..	73	..	2	..	11	..	55	..	72	..	5	..	16	..	49	..
Saskatchewan	7	..	6	..	..	..	..	..	5	..	7	..	..	..	..	..	1	..
Newfoundland	4	..	4	..	1	..	1	..	4	..	4	..	..	..	..	..	..	..
Total Canada	512	562	276	319	16	15	44	43	240	251	284	293	13	16	66	59	204	212
U. S. & Canada	6,085	6,320	2,370	2,578	124	124	498	480	2,501	2,614	3,374	3,404	253	234	968	923	3,306	3,339

aluminum castings, but more plants casting magnesium and zinc. The malleable total is unchanged. Number of steel foundries is higher, but if investment casting shops are excluded there is a decrease.

Ferrous Foundries — Gray iron foundries in the U. S. and Canada number 2370, a two-year drop of 208 and a decline of more than 1000 since the postwar peak. Actually, this downward trend dates back much farther; 50 years ago the gray iron industry boasted some 5000 shops.

Total number of steel casting producers has risen steadily the last ten years. This trend roughly approximates the growth in the investment casting industry. Producers of larger steel castings show a decline of about 10 per cent in number since 1949.

The malleable industry has been relatively stable during recent years in number of plants, although since ten years ago there has been a shrinkage of about 20 per cent.

Nonferrous Trend—Number of aluminum foundries has declined after rising steadily for six years. Aluminum producers still predominate in the casting industries, however, and show a 10 per cent increase since 1949.

Brass and bronze shops, on the other hand, have declined irregularly the last decade and are more than 10 per cent fewer than in 1949. Magnesium foundries have shown the greatest percentage gain —70 per cent in ten years.

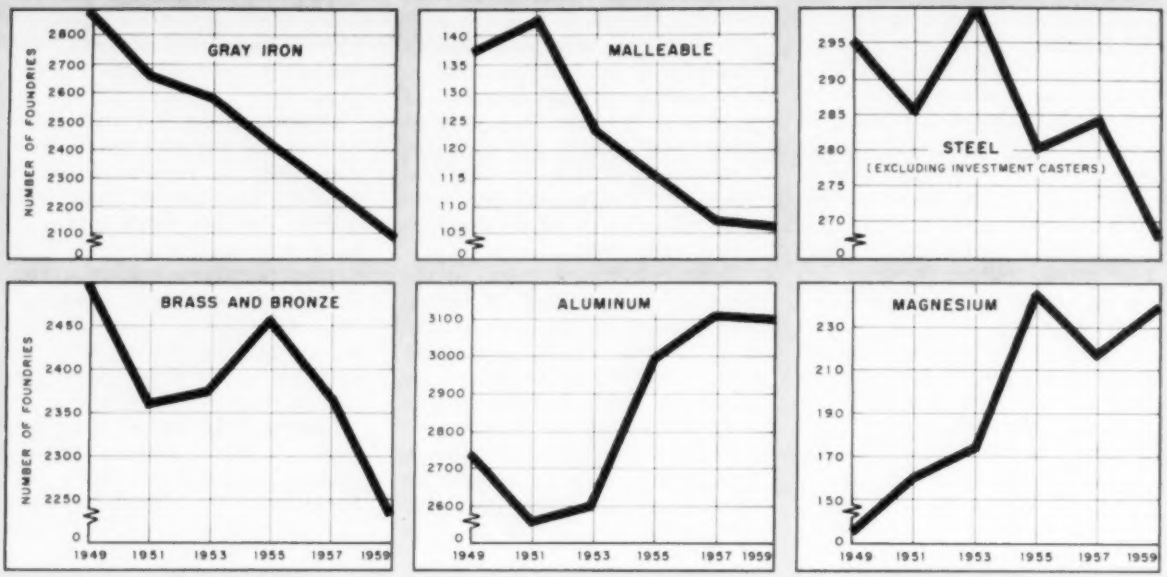
Distribution—The ranking of the principal foundry states remains the same as in 1957. Ohio leads with 564 foundries, followed by California, Pennsylvania, Illinois, Michigan, New York, Indiana, and Wisconsin. Jobbing foundries predominate, only about 27 per cent being exclusively or primarily captive shops.

Departments—Other data gathered in the industry census show that 2806 U. S. and Canadian foundries have pattern shops, 3047 operate machine shops, and 2475 have welding departments. Heat treating operations and radiographic inspection are growing; both the 1413 foundries with heat treating departments and the 446 doing radiographic inspection represent increases since two years ago.

Casting Processes — Sand continues to be the primary molding medium, although the 4424 sand foundries in the United States are 213 fewer than in 1957. Other

Nodular Iron Foundries	Die Casting Plants		Permanent Mold Foundries		Shell Mold Foundries		Centrifugal Casting Foundries		Plaster Mold Foundries		Investment Mold Foundries		CO_2 Mold Foundries	CO_2 Core Users	Shell Core Users	
1959	1959	1957	1959	1957	1959	1957	1959	1957	1959	1957	1959	1957	1959	1959	1959	
5	10	7	13	6	9	12	13	10	4	6	..	..	8	15	5	Alabama
..	4	4	4	6	1	1	1	..	1	..	2	2	5	5	2	Arizona
..	10	10	7	9	2	2	1	..	1	1	..	..	1	4	..	Arkansas
10	152	150	113	113	53	65	30	28	18	20	25	25	49	93	103	California
1	14	16	14	18	3	1	2	..	4	4	..	..	8	10	4	Colorado
7	37	31	20	27	16	18	3	4	7	5	7	6	18	23	12	Connecticut
..	..	1	1	..	..	..	..	..	..	..	..	..	3	4	2	Delaware
..	2	1	1	2	1	1	..	..	1	1	2	1	1	1	..	Dist. of Col.
2	18	11	17	14	8	7	3	3	3	2	1	..	6	10	6	Florida
2	7	8	12	9	1	3	1	1	4	5	..	..	6	9	6	Georgia
..	1	..	1	..	..	..	1	..	..	..	..	..	..	..	..	Hawaii
1	..	1	..	1	1	2	..	1	..	1	..	..	1	1	..	Idaho
17	134	124	59	56	46	46	8	12	20	20	12	11	43	79	52	Illinois
3	38	37	37	37	24	26	9	8	12	9	9	5	27	44	24	Indiana
4	11	11	11	9	4	3	1	..	2	2	1	..	14	27	8	Iowa
1	6	6	11	9	2	1	1	..	3	3	..	..	3	7	3	Kansas
..	6	4	2	..	2	3	..	..	..	1	..	1	4	5	4	Kentucky
..	2	4	1	3	1	..	..	..	1	..	1	..	3	4	2	Louisiana
..	3	3	..	..	..	..	1	..	..	1	..	..	1	5	..	Maine
1	4	7	3	8	1	3	1	3	1	..	..	..	6	10	1	Maryland
6	36	31	26	18	15	16	9	12	13	9	8	11	44	65	13	Massachusetts
17	125	120	58	54	45	59	17	21	15	14	12	12	50	70	35	Michigan
4	17	16	18	15	10	8	..	1	5	3	3	4	17	21	9	Minnesota
..	1	..	3	2	..	..	..	..	1	..	..	..	1	1	..	Mississippi
3	25	25	11	15	11	20	2	2	1	1	1	1	15	22	13	Missouri
..	..	1	1	2	..	..	..	..	..	..	..	..	1	1	..	Montana
..	4	7	8	8	3	4	..	..	3	3	1	1	3	6	1	Nebraska
..	..	..	1	1	..	..	..	..	..	..	..	..	..	..	..	Nevada
..	6	5	1	2	2	3	2	..	2	1	3	2	6	8	3	New Hampshire
4	53	60	39	37	20	35	13	17	11	11	11	8	26	41	15	New Jersey
..	..	2	..	1	..	..	..	..	1	1	..	..	1	1	..	New Mexico
8	102	90	56	60	42	54	22	23	23	17	33	26	55	80	48	New York
4	8	4	8	5	3	3	2	1	2	2	1	..	4	7	4	North Carolina
..	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..	North Dakota
34	107	91	78	73	47	45	29	23	32	26	17	13	65	136	45	Ohio
2	8	6	2	5	3	5	1	2	2	2	2	..	11	17	3	Oklahoma
3	14	15	11	7	12	7	5	3	..	1	3	3	9	12	14	Oregon
25	64	61	58	36	42	53	21	22	17	18	17	11	77	143	47	Pennsylvania
3	14	10	11	2	1	3	14	4	7	4	5	..	7	8	1	Rhode Island
..	1	..	2	1	1	1	..	..	1	2	..	..	2	4	1	South Carolina
..	..	..	2	..	..	..	..	..	..	1	..	..	..	..	..	South Dakota
2	9	8	12	6	3	6	2	1	3	1	..	1	7	7	3	Tennessee
5	33	34	30	25	19	13	11	6	5	8	4	3	37	47	19	Texas
1	2	..	3	4	..	1	..	1	..	..	..	..	2	2	1	Utah
..	..	1	1	..	2	1	..	..	..	..	..	..	2	2	1	Vermont
4	6	5	7	5	..	5	3	3	2	1	..	..	7	11	5	Virginia
4	16	14	9	7	10	14	1	3	2	4	2	2	11	18	11	Washington
1	1	1	3	4	3	2	3	1	..	1	..	1	2	5	3	West Virginia
12	36	37	24	32	32	38	12	13	5	5	4	3	38	74	37	Wisconsin
..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	Wyoming
196	1,147	1,080	810	755	501	590	245	229	235	217	187	153	706	1,165	566	Total U. S.
..	5	..	6	..	..	..	3	..	1	..	..	..	4	7	1	Alberta
3	8	..	9	..	4	..	..	..	1	..	1	..	6	14	8	British Columbia
2	3	..	7	..	..	..	..	..	1	..	..	..	1	4	1	Manitoba
..	2	..	1	..	..	..	..	..	..	..	..	..	1	1	1	New Brunswick
..	3	..	..	..	..	..	..	..	..	..	..	..	..	..	..	Nova Scotia
6	41	..	33	..	28	..	14	..	11	..	9	..	30	73	35	Ontario
..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	Prince Edward Island
2	19	..	14	..	5	..	7	..	4	..	2	..	11	19	14	Quebec
..	..	..	2	..	..	..	..	..	..	..	..	..	..	..	..	Saskatchewan
..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	Newfoundland
13	81	81	72	66	37	48	24	23	18	13	12	9	53	118	60	Total Canada
211	1,228	1,161	882	821	538	638	269	252	253	230	199	162	759	1,283	626	U. S. & Canada

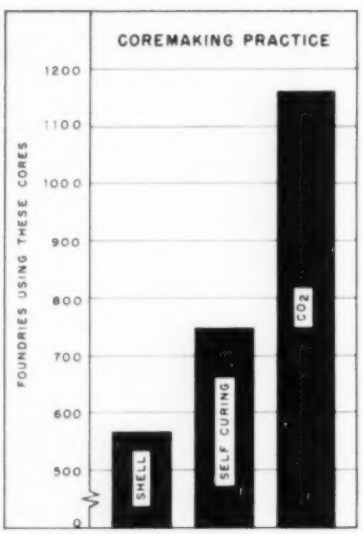
Trends in Number of U.S. Foundries



molding methods, headed by die-casting, have become more widely adopted during the last two years.

The table on the preceding page indicates a drop in the number of shell mold foundries since 1957. The 1957 total of 638 for the United States and Canada included, however, producers of shell cores as well as molds. This year a separate breakdown was made for shell core users, of which there are 626 in the two countries. The combined data show that 843 foundries produce either shell molds or cores, or both.

Application of CO_2 hardening of molds and cores has grown rapidly, with nearly 1300 foundries here and in Canada using this type of



core and 760 applying the process to molding.

Permanent mold use continues to expand steadily. Reflecting the sharp rise in production of aluminum castings, the number of permanent mold foundries has increased 53 per cent during the last ten years.

Melting Units — The last two years saw decreases in number of cupolas, open hearths, converters, air furnaces, and crucible furnaces in service. On the other hand, gains were made in number of arc and induction electric furnaces and reverberatory and noncrucible furnaces.

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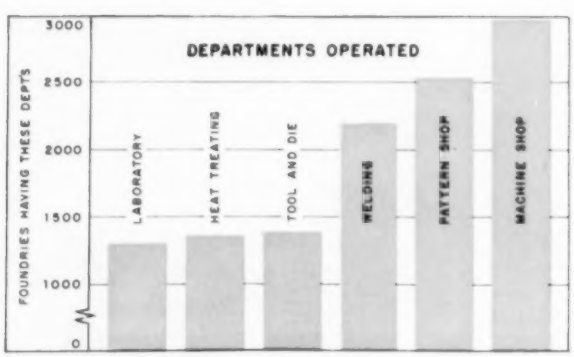
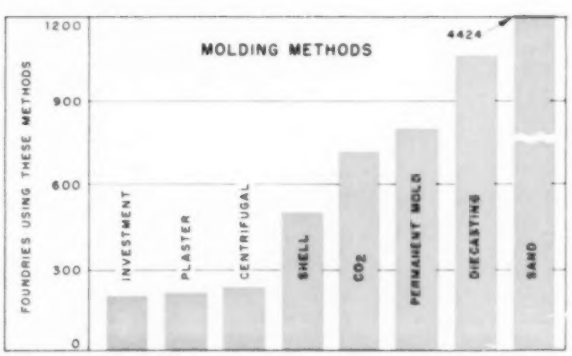
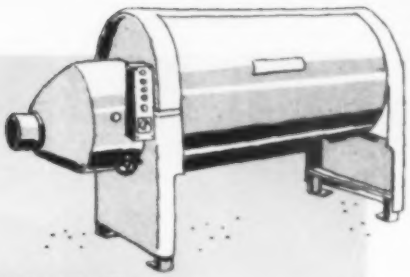
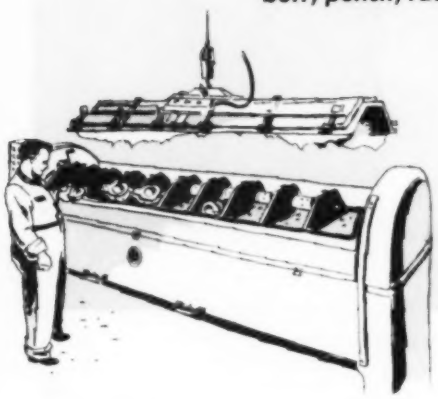






BARREL FINISHING OF CASTINGS

Barrel finishing reduces costs by cutting manhour requirements. It can be used to remove surface imperfections, deburr, polish, radius, burnish, and grind



By L. D. STEVENS
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Vicksburg, Mich.

● ADVANCES in equipment, techniques, media, and compounds have spurred the use of barrel finishing of castings in recent years. This trend is particularly strong for diecastings, investment castings, and other special-process castings. It applies in a lesser degree to finishing of sand castings.

Although barrel finishing is considered a "tumbling" method, it is a far cry from the process that many veteran foundrymen associate with the term. With the traditional method, no liquids or compounds are used, and the process is designed to clean, rather than to finish. Today, through the proper selection of media, compounds, water levels, and barrel rotation speeds and time cycles, barrel finishing can be used to remove surface imperfections, deburr, polish, radius, burnish, and grind.

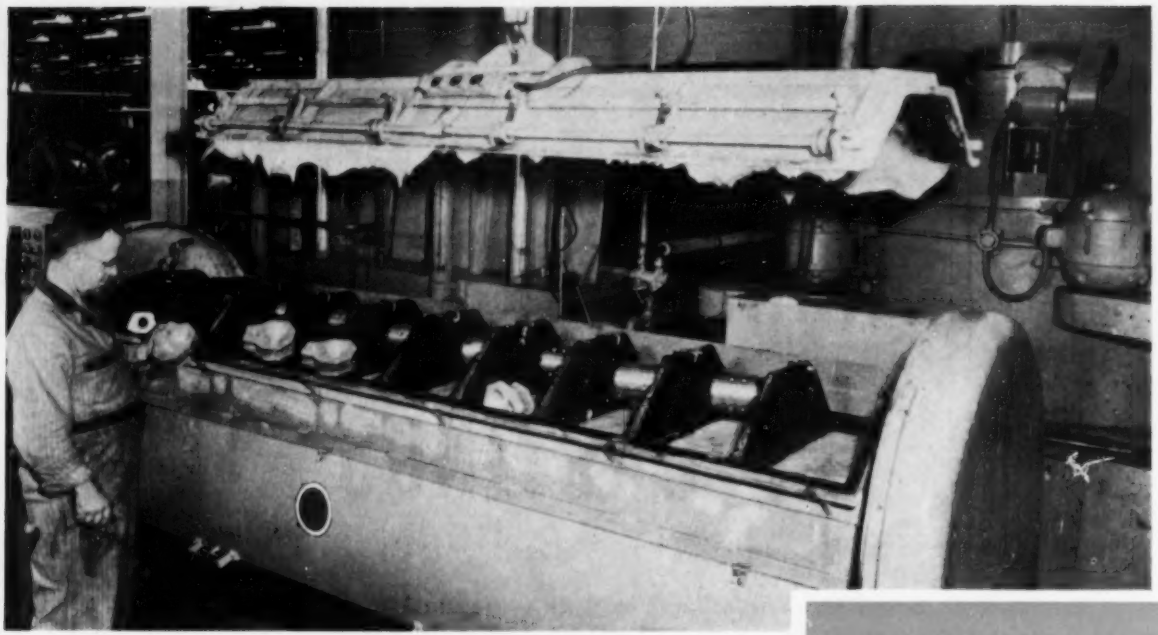
Although the ideal part for barrel finishing might be a small one, with surfaces that are curved, without deep or intricate cavities, and balanced in its weight and mass distribution, significant savings in finishing castings can be made even with parts that are far short of ideal.

Saves Labor—The savings come, of course, primarily from the fact that manhour requirements in barrel finishing are at a minimum. Beyond loading and unloading, the barrel finishing process requires no labor except an occasional check on the operation of the barrels. Because it offers a finish comparable to that achieved with manual methods such as grinding, buffing, polishing, etc., barrel finishing plays an important role in keeping manufacturing costs down.

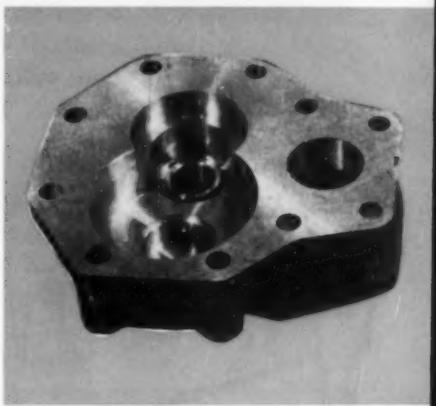
Perhaps the most readily observed savings come with relatively small parts, hundreds or even thousands of which can be finished in a single barrel or compartment load. By eliminating the need for handling each part individually, barrel finishing makes its principal economies.

Finishing Is Uniform — Often, however, uniformity of finishing is the important benefit. Mass produced items that must match, mesh, or otherwise fit in with other items or that must have a symmetry or balance frequently are good candidates for barrel finishing, even though they do not meet the ideal requirements otherwise.

At Pesco Products Div., Borg-



Parts to be deburred in ten-compartment machine are either submerged in the media mass or suspended on fixtures that rotate in the media



Barrel finishing deburrs, leaving a smooth, finished part within prescribed dimensional tolerances. Finished part is on the right

Warner Corp., Bedford, Ohio, for instance, precision parts for the aircraft and missiles industries require uniformity and a high degree of accuracy in finishing. With hand finishing, both labor costs and scrap loss were high.

Although many parts are small, those now barrel finished range from 1/4 in. square to pump bodies 17 in. in diam. Weights range from a fraction of an ounce to 15 lb. The parts are principally aluminum diecastings, brass and steel castings, and stampings. Barrel finishing is used to deburr and to impart a uniform finish—either polished or burnished—to meet inspection requirements.

Equipment used includes one 2-cu-ft, two-compartment machine; one 5-cu-ft, one-compartment machine; two 10-cu-ft, two-compartment machines; and one ten-compartment machine with 3.2-cu-ft capacity per compartment. All are products of Techline Div., Wheelabrator Corp., Vicksburg, Mich.

The equipment is operated continuously through two 8-hour shifts daily. Many smaller parts are batch-finished in loads of up to 5000 pieces simultaneously. One of the smallest parts, a valve component, is finished in quantities of 10,000 per batch.

From this extreme of bulk handling, parts vary to individual items finished on simple fixtures within the compartments, and one or two are submerged in the media mass within a single compartment.

Before installing barrel finishing equipment, this firm employed 50 workers for deburring operations—400 manhours per day. Since the equipment was installed, labor costs for finishing have been reduced 42 per cent. A comparison of total finishing time by former methods against total finishing time by mechanical barrel process illustrates the savings possible: A pump housing which required 0.2181 hr per piece by former methods requires 0.0933 hr per piece with barrel finishing. Time required to finish pump blades was cut from 0.0114 hr per piece to 0.0091 hr. Motor assembly yokes which required 0.0313 hr each are cleaned in 0.0275 hr per piece by barrel finishing.

Close Tolerances—Tolerances in all the company's workpieces are close. They range from 0.0001 to 0.0005 in. Because tolerances of this degree were difficult to obtain by hand methods, the rejection rate was high. Since the installation of barrel finishing equipment, Pesco has made additional savings through a much higher rate of acceptable production. Quality of the work is much improved, surfaces are blended uniformly, and appearance is more acceptable to customers.

It also has been possible to eliminate many buffing and polishing operations as a result of the superior finishing. This reduction has enabled the company to reduce the number of employees engaged in finishing operations from 50 to 10.

One operator can control the entire barrel finishing line in times of normal production, and during peak periods, two operators handle the equipment.

Superior Surfaces—At Orthopedic Frame Co., Kalamazoo, Mich., barrel finishing replaced hand polishing and buffing to achieve the desired surface condition. This company makes hospital and surgical equipment and traction apparatus used in orthopedic treatment. In this instance, tolerances are not critical. Although quantities are not large, the hand methods formerly employed to finish various castings prior to plating frequently resulted in costs exceeding those of plating. Finish quality and uniformity were not satisfactory.

Sand-cast spreader handles formerly cost an estimated $1.75 for polishing and buffing operations prior to plating. Now, finishing cost has been reduced to only 45 cents a pair by barrel processing. Finish is improved, a smooth radius is produced on the edges, and plating quality is improved as a result of the superior preplating finish.

Three Stages—Barrel finishing of this part involves three stages: 1. *Cut-down*—processing from 24 to 36 hours using a coarse-abrasive type compound and aluminum oxide media. 2. *Polishing*—a mild abrasive compound and type L media are used. This cycle lasts 4 to 6 hours. 3. *Second polishing*—a polishing compound is used with type L media. The cycle lasts approximately 3 hours. Approximately 100 sets of parts are finished per batch.

A C-clamp assembly would be particularly hard to finish by hand methods because of its size and shape. It is a red brass sand casting which subsequently is assembled into a complete clamp unit. This part also is finished in three steps. About 20 hours is consumed for cut-down with a coarse abrasive compound and aluminum oxide chips. The next step is 4 to 6 hours of processing with a mild abrasive compound and type L media. Finally, the assembly is polished for 3 hours with a fine polishing compound and type L media.

Selling Aid—With all of the advances made in the cast metals industry in recent years, advances aimed at higher quality castings, closer tolerances, and better finish, barrel finishing offers many foundries an opportunity for further progress.

Foundries must emphasize selling so that the cast metals industry can gain its fair share of the market. New developments in design and production techniques provide good sales ammunition, and processes such as barrel finishing can help to sell castings by providing better looking, better finished parts.

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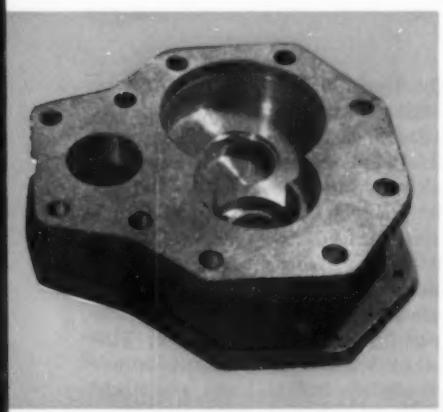
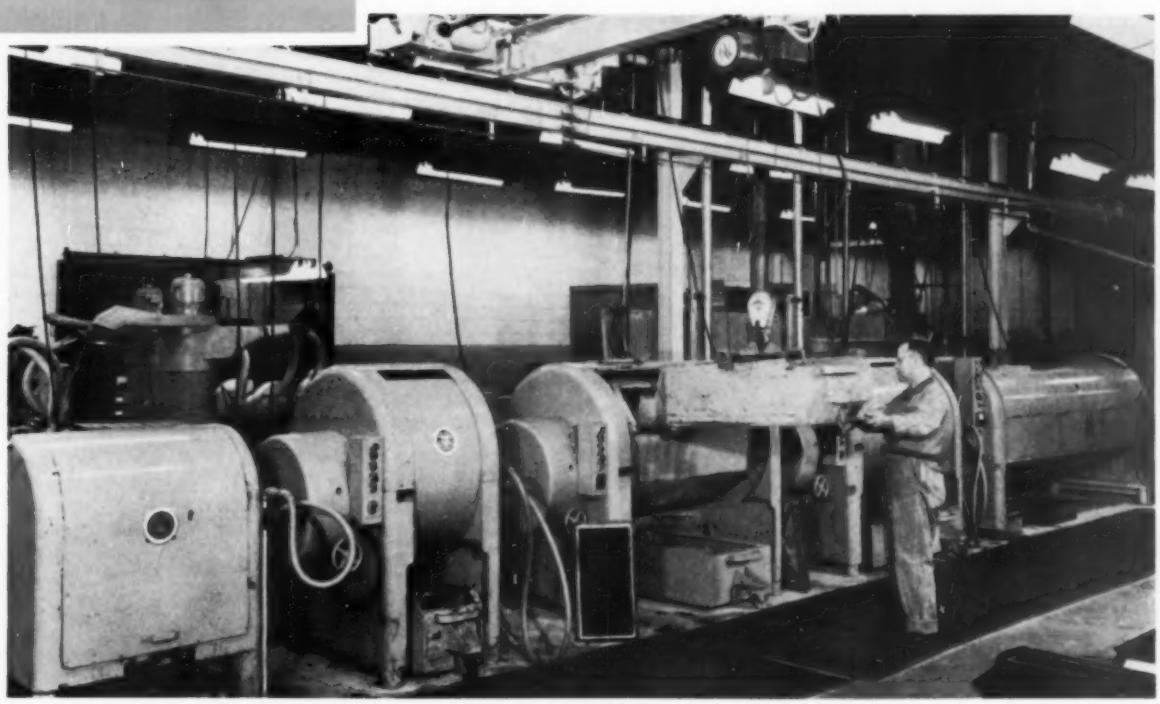
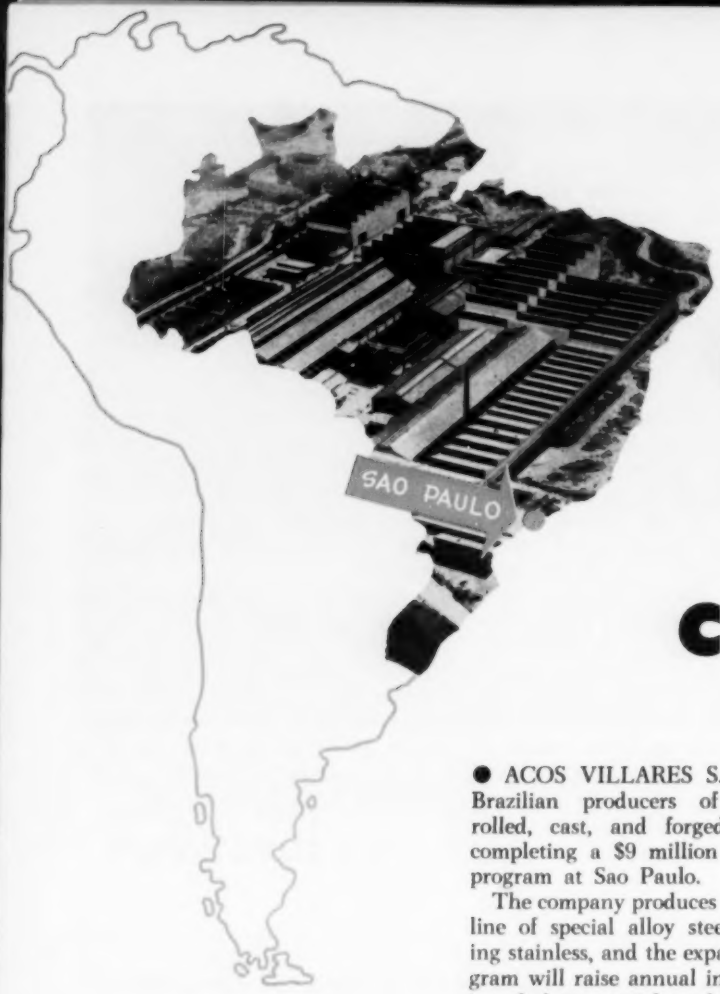


Operations performed in the barrel finishing department include deburring and imparting a polished or burnished finish to meet requirements





Bird's-eye view of Acos Villares S. A. plant shows steel foundry, forging department, and the steel rolling mill

Brazilian Steel Foundry

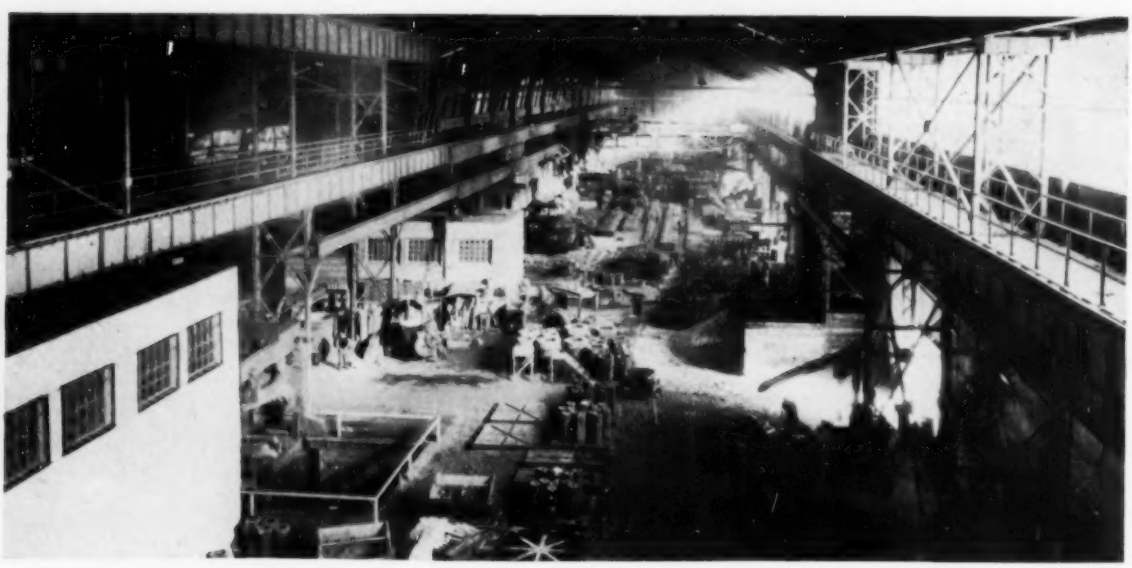
EXPANDS MELTING CAPACITY

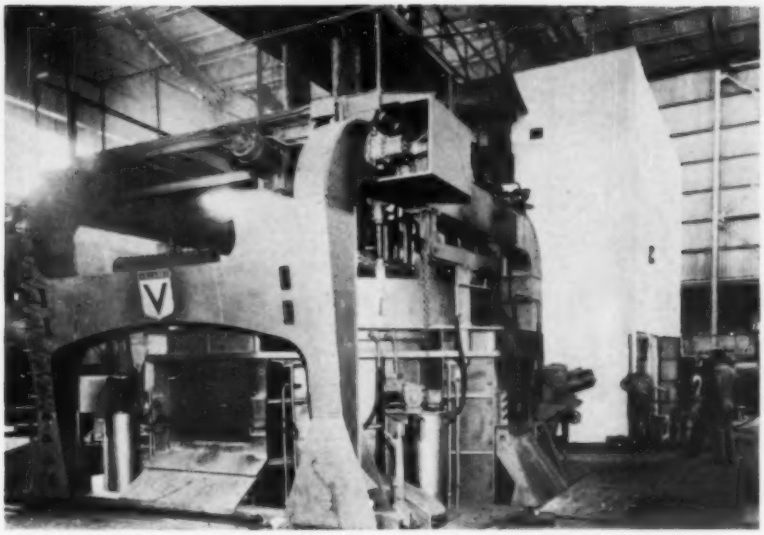
● ACOS VILLARES S. A., large Brazilian producers of steel in rolled, cast, and forged form, is completing a $9 million expansion program at Sao Paulo.

The company produces a complete line of special alloy steels, including stainless, and the expansion program will raise annual ingot capacity of these special steels to 45,000 tons, a 300 per cent increase.

The Acos Villares S. A. enterprise, founded in the late 1930s by Dr. Luiz D. Villares, includes the following organizations: Elevadores Atlas S. A., large manufacturer of elevators and technically associated with Westinghouse Electric International Co.; Equipamentos Industriais Villares S. A., manufacturer of cranes, power shovels, and other industrial equipment under a licensing agreement with the Harnischfeger Corp., Milwaukee; Troleibus Villares S. A., manufacturer of electric trolley buses and tech-

Molding and pouring bay. Steel castings up to 20 tons are produced





Major item of new equipment is 15-ton electric arc furnace. Duplicate unit is planned to provide a further increase in mill capacity

nically associated with Marmon-Herrington Co. of the United States; and Vibar Industria e Comercio S. A., one of the oldest producers of piston rings for internal combustion engines.

A major item in new equipment additions by Acos Villares was the installation of a third electric arc furnace. This unit, of 15 tons capacity, was built by the company. Because of its successful operation, installation of another duplicate unit is planned to enlarge capacity.

The steel foundry produces both plain carbon and high alloy castings, the maximum size being about 20 tons. The plant also includes a rolling mill for production of special steel bars and a forging department. A new 2000-ton hydraulic press is used for making forgings of both tool steels and constructional alloy steels.

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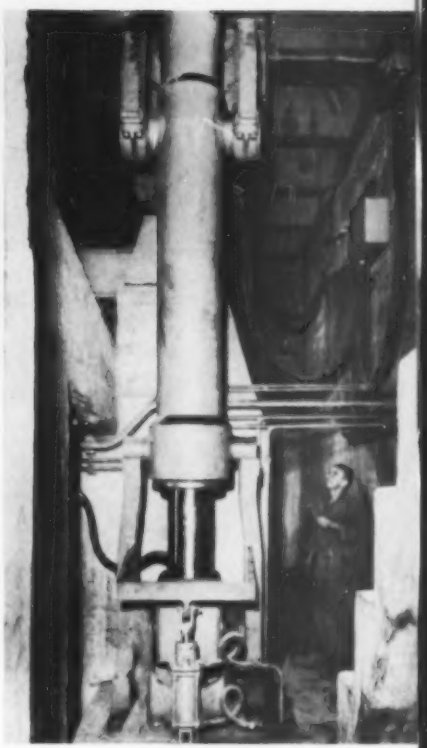
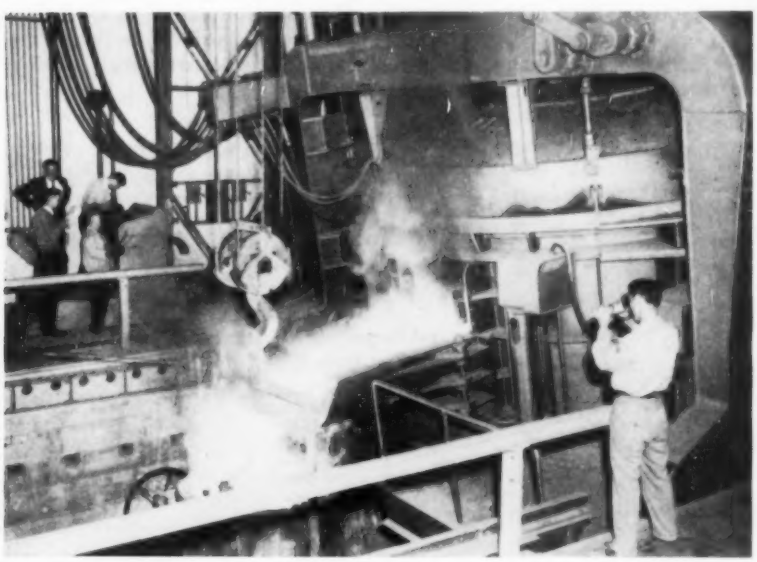


Close-up of tilting piston of the 15-ton electric arc furnace

View shows one of largest castings produced by Acos Villares

As furnace is tapped, melt temperature is checked with optical pyrometer



Aluminum-Rich Zinc-Base Alloys for PERMANENT MOLD

Preliminary investigations indicate that a further evaluation should be made of the potential use of aluminum-rich zinc-base alloys as low-cost permanent mold casting materials

● A PRELIMINARY examination of aluminum-rich zinc-base alloys indicates that further evaluation should be made of the potential use of these alloys where a low-cost permanent mold casting alloy is required. The composition of alloys considered is 50 to 65 per cent zinc, 50 to 35 per cent aluminum, and 1 to 5 per cent copper.

Alloys which fit this general category were thoroughly investigated by the Germans as substitute materials for the copper-base alloys, which became scarce during World War II. Alloys of similar nature currently are advertised in Austria and England. British Specification D.T.D. 598 describes the composition limits for one alloy in this group and indicates that castings for lightly stressed parts are made of such an alloy.

During World War II, an alloy of 65 per cent zinc, 32 per cent aluminum, and 3 per cent copper was used primarily as sleeve bearings, backed by steel, for aircraft and railway parts. A smaller amount of the same alloy was reported by Schramm[1] to have performed successfully as bearings in forging presses, wire - straightening machines, sawmills, and similar machinery.

A reference[2] in the technical literature to the effect that a relatively high-strength zinc-base alloy had been used successfully by the Germans prompted an investigation to determine the merits of this alloy. The investigation consisted of two phases, one to determine the castability of the alloy and to measure mechanical properties, and the other to conduct a literature survey for reports which might reveal the basis for the use of this alloy by the Germans.

Experimental Castings — Several castings of the shape shown in Fig. 1 and several pairs of test bars were made in green sand molds. Composition of the castings and test bars is shown in Table I. Tensile properties determined on test specimens cut from the castings and on separately cast test bars are listed in Table II. As a matter of comparison, typical tensile test values shown in this table for a standard tin-bronze alloy of the composition 88 per cent copper, 8 per cent tin, and 4 per cent zinc demonstrate that the zinc-base alloy shows a decided superiority in yield strength, but a much lower ductility.

In the manufacture of these and other experimental castings, the zinc alloy showed a high fluidity

TABLE I—Composition of Experimental Zinc-Base Alloy Castings

Zinc	Aluminum	Copper	Magnesium	Lead	Tin	Cadmium
%	%	%	%	%	%	%
66.64	31.1	2.14	0.02	0.03	0.03	0.01

TABLE II—Mechanical Properties of Experimental Sand Cast Zinc-Base Alloy

	Separately Cast Test Bars	"As Received" Sample Casting	88% Copper-8% Tin-4% Lead Sand Cast
Tensile strength, psi	54,000	53,800	48,000
Yield strength, psi (0.5% extension)	39,000	32,600	23,000
% Elongation	3.7	2.1	30
Rockwell "B" hardness	67	67	68

Note: Composition of test bars and castings shown in Table I.

Fig. 1—Sand casting made of aluminum-rich zinc-base alloy

CASTINGS

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and accurately reproduced the mold details.

It is well known that zinc-base alloys such as the type used for diecasting are susceptible to intergranular corrosion when excessive impurities are present. To determine whether the aluminum-rich zinc alloy would behave in similar fashion, a casting such as shown in Fig. 1 was exposed to water vapor at 95° C for ten days. The results of this exposure are demonstrated in Fig. 2, in which it can be seen that a white corrosion product formed and that some cracking developed. Since a chemical analysis revealed the presence of 0.03 per cent lead, 0.03 per cent tin, and 0.01 per cent cadmium, it appears that the aluminum-rich alloy is subject to the same detrimental effects of lead and tin as are other zinc alloys.

TABLE III—Mechanical Properties After Exposure to Steam Test

	"As Received" Sample Casting	After Steam Vapor Test
Tensile strength, psi	53,800	35,400
Yield strength, psi (0.5% extension)	32,600	35,400
% Elongation in 1.4 in.	2.1	0.3
Rockwell "B" hardness	67	62

By microscopic examination it was determined that the material had corroded to a fairly uniform depth of 0.009 in. Fig. 3 illustrates this condition. During this examination, extensive microporosity was noted, as can be seen in Fig. 3.

Sections were cut from the web of the casting which had been exposed to the steam vapor test to determine whether this alloy would, again in similar fashion to the other zinc alloys, show deterioration of properties under the test conditions. The tensile samples which were machined from the exposed casting were carefully examined to insure that no surface cracking existed. The results of the tests shown in Table III reveal the considerable reduction in tensile strength, from 53,800 to 35,400 psi, and the severe decrease in ductility, which occurred in the casting as a result of the water vapor test.

From the results of the experimental work, it was evident that a great number of questions would have to be answered before this alloy could be evaluated properly. These questions included the types of molding media suitable for this alloy, the optimum compositional range, the permissible amount of impurities, corrosion resistance under various conditions, and typical mechanical and physical properties. Since the task of experimentally supplying the above answers would have been lengthy and expensive, further experiments were postponed in favor of completing the literature survey.

TABLE IV—Composition Range Established by Germans for 65% and 50% Zinc Alloys[6]

	65% Zinc Alloy	50% Zinc Alloy
% Aluminum	30.5-33.5	46.0-50.0
% Copper	2.5-3.5	1.5-2.5
% Magnesium	0.03	0.005-0.15
% Silicon	0.2 max.	0.3 max.
% Iron	0.4 max.	0.4 max.
% Lead	.....	.....
% Cadmium	.....	.....
% Zinc	Remainder	Remainder
% Others, total	0.1	.....

TABLE V—Suggested Compositions for Aluminum-Rich Zinc Alloys

	65% Zinc Alloy	50% Zinc Alloy
% Aluminum	30.5-33.5	46.0-50.0
% Copper	2.5-3.5	1.5-2.5
% Magnesium	0.005-0.05	0.005-0.05
% Silicon	0.2 max.	0.2 max.
% Iron	0.2 max.	0.2 max.
% Lead	0.007 max.	0.007 max.
% Tin	0.005 max.	0.005 max.
% Cadmium	0.005 max.	0.005 max.
% Zinc	Remainder	Remainder

Literature Survey—Unfortunately, most development work on the aluminum-rich zinc-base alloys discussed in the published articles dealt with extruded material, but Pelzel[3, 4] investigated the properties of sand-cast material. In addition to the 65 per cent zinc, 32 per cent aluminum, 3 per cent copper alloy which the Germans used, one

Fig. 2—Casting after 10 days exposure to 95° C water vapor. Note white corrosion product and crack in projection near center of cylindrical portion

similar alloy which was thoroughly investigated contained 50 per cent zinc, 48 per cent aluminum, 2 per cent copper. It was found to be superior in some respects to the other alloy. The alloy with 50 per cent zinc was not used in production since its development was not completed until after the war.

TABLE VI—Physical Properties of Extruded Zinc Alloy Composition 65% Zn, 32% Al, 3% Cu, .05% Mg[5]

Density	0.17 pound/inch³
Liquidus temperature	508°C
Solidus temperature	425°C
Electrical conductivity	28%

Both alloys were produced experimentally by hot extrusion,[5] drop forging,[5] bench drawing,[5] chill casting,[5] and sand casting,[3] but only the extrusion process was used in commercial production. To simplify identification of these alloys in the remainder of this report, the 65 per cent zinc, 32 per cent aluminum, 3 per cent copper alloy will be referred to as the 65 per cent zinc alloy and the 50 per cent zinc, 48 per cent aluminum, 2 per cent copper alloy as the 50 per cent zinc alloy.

Chemical Composition—According to the literature, the preferred compositions established for these alloys for German industrial use are as shown in Table IV. Schramm[6] stated that the maximum total impurities other than iron and silicon for the 65 per cent zinc alloy should not exceed 0.1 per cent. He made no mention, however, of the permissible limits for lead, tin, and cadmium. The same author[6] describes the specification of the 50 per cent zinc alloy in a manner which suggests that lead, tin, and cadmium are completely absent from the material.

Pelzel[4] shows that for sand-cast material, a range of 0.005 to 0.05 per cent magnesium is desirable since some magnesium is needed to impart corrosion resistance; but amounts greater than 0.05 per cent reduce elongation to less than 4 per cent. The Germans specified a maximum iron content of 0.4 per cent, but Pelzel[3] points out that at 0.5 per cent iron, the elongation is reduced to zero.

Since the impurity limits were not clearly defined in the available reference, it would appear well to consider the limits established for the standard zinc die-cast alloys as applicable for these aluminum-rich zinc alloys. Suggested compositional ranges are shown in Table V.

Mechanical and Physical Properties—Data pertaining to the physical and mechanical properties of the zinc-base alloys are presented in Tables VI and VII. For comparison purposes, two commercial cast copper alloys are included in Table VII. In general, the properties of the zinc alloys compare favorably with those of the other materials often used in structural applications.

One area in which the zinc alloys appear to be significantly inferior is creep strength. As shown in Table VIII, which compares the extruded 65 per cent zinc-base alloy with two commercially used wrought copper alloys, the resistance of the zinc alloy to creep is quite poor. This weakness is particularly evident when it is realized that the copper-alloy data is based on tests at 150° C, whereas the zinc material was tested at room temperature. Although creep strength data are available for only the wrought form, it is reasonable to assume that the cast zinc-base alloy will have similar creep strength.

Effect of Composition on Mechanical Properties—The effect on properties of what might be considered normal production deviations from a nominal composition is described in Table IX. The mechanical properties were determined using bars separately cast in sand molds.

Only two changes in composition have relatively important effects. One is the reduction of percentage of elongation for the 65 per cent zinc alloy when 1 per cent copper is added to the nominal amount of 3 per cent. The other is the reduction in percentage of elongation when 0.05 per cent magnesium is added to the 65 per cent zinc-base alloy.

Dimensional Stability — Because zinc-base alloys are susceptible to dimensional changes with aging at room temperature or slightly elevated temperatures, specimens were tested for dimensional stability. Table X shows the results of dimensional stability tests on the 65 per cent zinc alloy as-cast bars. These tests were conducted at room temperature (20° C) for 18 hours

TABLE VII—Comparison of Typical Mechanical Properties of Cast Zinc-Base Alloys with Some Commercial Copper-Base Alloys

Alloy	Tensile Strength, psi	Yield Strength, 0.2% Offset, psi	Elongation, % in 2 in.
65% Zinc[3]	59,600	49,700	3
50% Zinc[3]	52,700	.....	7.5
Manganese bronze	68,000	27,000	28
88% Copper, 8% tin, 4% zinc	48,000	23,000	30

TABLE VIII—Comparison of Creep Strength of 65% Zinc Alloy with Some Copper-Base Alloys

Material	Condition	Stress, psi	Temperature °C	Maximum Creep Rate, % per Hour
65% Zinc Alloy[5]	"As extruded"	10,000	25	5×10^{-4}
Phosphorized copper[5]	Drawn 21%	10,000	150	0.019×10^{-4}
High-Silicon bronze[5]	Wrought-annealed	10,000	150	0.011×10^{-4}

TABLE IX—Effect of Varying the Alloying Elements on Tensile Properties of 65% and 50% Zinc Base Alloys[a]

Nominal Composition	Change in Amount of Alloying Element	Effect on: Tensile Strength, psi	Effect on: Elongation, %
	ALUMINUM[3]		
65% Zinc, 32% aluminum[b] 3% Copper	Increase 2%	Insignificant	Slight reduction
	Decrease 2%	Insignificant	Slight reduction
50% Zinc, 48% aluminum 2% Copper	Increase 2%	Insignificant	Insignificant
	Decrease 2%	Insignificant	Insignificant
	COPPER[3]		
65% Zinc, 32% aluminum 3% Copper	Increase 1%	Insignificant	11 to 5
	Decrease 2%	55,000 to 51,000	11 to 9
50% Zinc, 48% aluminum 2% Copper	Increase 1%	Insignificant	8 to 5
	Decrease 1%	53,000 to 50,000	8 to 6
	MAGNESIUM[3]		
63% Zinc, 35% aluminum 2% Copper, 0% magnesium	Increase 0.05%	54,000 to 62,000	10 to 4

Notes: a. All values are for sand cast alloys. b. The bold-face element is the one being varied.

and at 95° C for an additional 8 hours.[3] These data show that the 65 per cent zinc alloy as cast compares favorably with the standard diecast zinc alloy with which it is compared here.

Pelzel[3] reports that the dimensional changes for a zinc-base alloy of 50 per cent zinc, 48 per cent aluminum, 2 per cent copper would be similar to those for the 65 per cent zinc alloy, but he did not furnish any data.

Corrosion Resistance—No corrosion tests were reported for cast material, but the extruded material was investigated thoroughly. Since the effect of impurities should be similar for cast materials, the results are included as Tables XI through XV.

Corrosion tests included exposure to water vapor at 95° C, exposure to outdoor weathering, and continuous and interrupted immersion in synthetic sea water. For comparison, data on a standard zinc diecasting cast alloy and a common brass alloy are included in these tables.

The data show that the 65 per cent zinc alloy containing no measurable amounts of lead, tin, or cadmium had corrosion resistance equivalent to that of the standard diecasting zinc alloy, but somewhat inferior to that of the brass material. As the impurity content increases, however, corrosion resistance appears to suffer, especially as indicated by the exposure to water vapor at 95° C.

It should be pointed out that according to Schramm,[1] weathering tests, continuous immersion in sea water, and intermittent immersion in sea water provide more reliable and consistent evaluation of corrosion resistance than the water vapor technique. The latter procedure would be simulated only by tropical conditions.

Both Schramm[6] and Pelzel[4] indicated that the rate of corrosion of the 50 per cent zinc alloy is only about one-half that of the 65 per cent zinc alloy. Furthermore, Gebhardt[7] states that the best corrosion resistance, at least in the water vapor tests, is obtained when lead, tin, and cadmium are completely absent. Schramm[6] indicates agreement with this conclusion.

Gebhardt[7] also investigated the susceptibility of the 65 per cent zinc alloy to stress corrosion by immersing stressed samples in a 3 per cent aqueous salt solution for 120 days at room temperature. None of the specimens showed significant deterioration, a fact which prompted Gebhardt to conclude that the alloy is not susceptible to stress corrosion.

The response to heat treating for the cast zinc-base alloys was not studied thoroughly, but Pelzel[3] stated that an aging treatment caused tensile strength to decrease and elongation to increase.

TABLE X—Dimensional Stability of 65% Zinc Alloy and a Commercial Zinc Diecasting Alloy

Alloy	Condition	—% Change in Length— 18 Hours at 20° C	8 Additional Hours at 95° C[a]
65% Zinc[3]	As Cast	0.02	0.09
		350 Hours at Room Temperature	
Zamak 5[11]	As Cast	0.09	

Note: a. The 8 hours at 95° C followed after the sample had been held for 18 hours at 20° C.

Schramm[1] and Gebhardt[10] studied the effect of heat treatment consisting of solution treatment, quench, and aging. They found that aging at room temperature causes an increase in tensile strength and a decrease in ductility.

Foundry Characteristics — The zinc-base alloys were prepared by melting in gas-fired crucible furnaces and in induction melting furnaces.[3, 5] Copper additions were made by means of a 50-50 aluminum-copper master alloy.[3] A protective flux consisting of sodium chloride, potassium chloride, and cryolite permitted the use of scrap material in the form of clean machine turnings. The melting loss was reported to be 0.5 per cent aluminum.[5, 6]

The degree of superheat prior to pouring was listed as 200° C.[3, 5] In his investigations of a series of aluminum-rich, zinc-base alloys, Pelzel[3] used a procedure, prior to pouring, of stirring the molten metal with a graphite-coated iron bar to collect

Fig. 3—Photomicrograph of sample from corroded area of casting as shown in Fig. 1. Corrosion has proceeded rather uniformly to a depth of about 0.009 in., as shown by layer at top of photograph

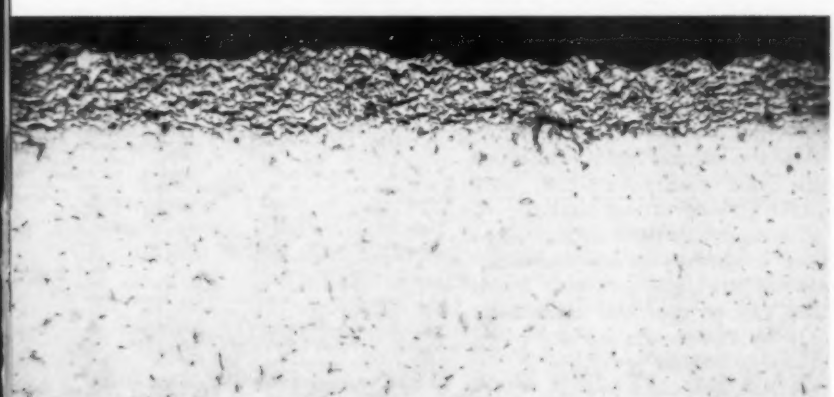

TABLE XI—Corrosion Resistance in Water Vapor Test at 95°C for 28 Days[7]

Material	Condition	Depth of Corrosion, in
65% Zinc alloy[a]	Extruded	0.012
65% Zinc alloy[a]	Extruded and heat treated[d]	0.008
65% Zinc alloy containing impurities[b]	Extruded	0.019
65% Zinc alloy containing impurities[b]	Extruded and heat treated[d]	0.01
Leaded brass[c]	Extruded	<0.0019
Zinc-Base diecasting alloy (same as Zamak 5)	Extruded	0.012

Notes: a. Material contained no lead, tin, or cadmium. b. Material contained 0.021% lead and 0.006% cadmium. c. Brass of following composition: 58% copper, 2.5% lead, 39.5% zinc. d. Heat treatment consisted of 6 hours at 340° C, water quench, and 15 hours at 120° C.

TABLE XII—Corrosion Resistance in Natural Weathering[a] for 4½ Months[7]

Material	Condition	Weight Increase from Corrosion Products, gm/mm²×10⁻⁴
65% Zinc alloy[b]	Extruded	<2.0
65% Zinc alloy[b]	Extruded and heat treated[d]	<2.0
65% Zinc alloy containing impurities[c]	Extruded	<2.0
65% Zinc alloy containing impurities[c]	Extruded and heat treated[d]	<2.0
Zinc-Base diecasting alloy (same as Zamak 5)	Extruded	10.0

Notes: a. Samples were set on a roof and exposed to natural weather conditions. b. The 65% zinc alloy contained no lead, tin, or cadmium. c. This alloy contained 0.021% lead and 0.006% cadmium. d. Heat treatment consisted of 6 hours at 340° C, quench in water, and 15 hours at 120° C.

TABLE XIII—Change in Mechanical Properties After 15 Months Natural Weathering[7a]

Material	Condition	Loss in Tensile Strength, psi	Loss in % Elongation
65% Zinc alloy[b]	Extruded	1,710	2.0
65% Zinc alloy[b]	Extruded and heat treated[d]	5,830	4.1
65% Zinc alloy containing impurities[c]	Extruded	1,000	0.3
65% Zinc alloy containing impurities[c]	Extruded and heat treated[d]	2,420	0.7
Zinc-Base diecasting alloy (same as Zamak 5)	Extruded	2,000	6.6
Brass—58% copper, 2.5% lead, 39.5% zinc	Extruded	570	0

Notes: a. Samples were placed outdoors exposed to natural weathering conditions. b. This zinc alloy contained no lead, tin, or cadmium. c. This zinc alloy contained 0.021% lead and 0.006% cadmium. d. Heat treatment consisted of 6 hours at 340° C, water quench, and 15 hours at 120° C.

TABLE XIV—Corrosion Resistance to 122 Days Continued Immersion in Synthetic Sea Water[a, 7]

Material	Condition	Thickness of Corrosion Layer, in.	Increase in Weight gm/mm²×10⁻⁴
65% Zinc alloy[b]	Extruded	<0.0002	34
65% Zinc alloy[b]	Extruded and heat treated[d]	<0.0002	45
65% Zinc alloy containing impurities[c]	Extruded	0.0002	16
65% Zinc alloy containing impurities[c]	Extruded and heat treated[d]	0.0002	19.5
Zinc-Base alloy (same as Zamak 5)	Extruded	Not measurable	10.5

Notes: a. The corrosion medium was made by adding salt to water to simulate sea water. b. This alloy contained no lead, tin, or cadmium. c. This alloy contained 0.021% lead and 0.006% cadmium. d. Heat treatment consisted of 6 hours at 340° C, quench in water, and 15 hours at 120° C.

TABLE XV—Corrosion Resistance to 122 Days Interrupted Immersion in Synthetic Sea Water[a, 7]

Material	Condition	Corrosion Layer Thickness, in.
65% Zinc alloy[b]	Extruded	<0.002
65% Zinc alloy[b]	Extruded and heat treated[d]	<0.002
65% Zinc alloy containing impurities[c]	Extruded	<0.002
65% Zinc alloy containing impurities[c]	Extruded and heat treated[d]	<0.002
Zinc-Base diecasting alloy (same as Zamak 5)	Extruded	<0.002
Brass (58% Copper, 2.5% Lead, 39.5% Zinc)	Extruded	<0.002

Notes: a. The corrosion medium was made by adding salt water to simulate sea water. b. This alloy was made with pure materials. c. This alloy contained 0.021% lead and 0.006% cadmium. d. Heat treatment consisted of 6 hours at 340° C, quench in water, and 15 hours at 120° C.

oxidized particles at the surface of the bath. The same investigator used a pouring temperature of 600° C, about 100 degrees C higher than the liquidus (508° C), to make the sand-cast test bars.[3] Gebhardt[5] used a temperature of 680° C to pour the 65 per cent zinc alloy into water-cooled iron molds and stated that the resultant ingots were sound. Pelzel[3] states that the 65 per cent and 50 per cent zinc alloys have a tendency to contain microporosity and that completely sound bars can be produced consistently only by casting the metal in chill molds.

Although no data were shown for permanent mold castings, the statements and related experiments of the investigators would indicate that zinc-base alloys can be cast satisfactorily in permanent molds. The low temperature required to pour these alloys would provide an advantage by prolonging die life as compared with the higher melting copper-base alloys.

Application — In many applications, loads are applied intermittently. Under such conditions, creep strength would not be an important factor, and these zinc-base alloys may well be satisfactory. Furthermore, the relative cost of the zinc-base alloys compared with that of copper-base materials presents opportunities for cost reductions. This situation is enhanced by the lower density of the zinc-base alloys—i.e., approximately 0.17 lb per cubic inch for the zinc-base alloys compared with about 0.32 lb per cubic inch for copper-base alloys.

From a standpoint of dimensional stability and corrosion resistance, some limitation of the environmental conditions under which these alloys can be used may be necessary, but would be no more restrictive than for the zinc diecast alloys. Further work would be required to evaluate this situation fully and to verify the composition ranges suggested here.

Acknowledgment — The author wishes to acknowledge the assistance of the Engineering Department of Linhart Foundry in supplying samples and in the evaluation of the foundry characteristics of the material.

REFERENCES

1. J. Schramm, "Extruded Products of the Alloy Zn Al_{22} Cu_6," *Metall*, 1954, 8, 169.
2. Anon., "New Zinc Alloy," *Metal Progress*, 1950, 58, 558.
3. E. Pelzel, "Aluminum-Zinc Alloys," *Metall*, 1954, 3-4, 83.
4. E. Pelzel, "Intercrystalline Corrosion of Zinc-Aluminum-Copper Alloys," *Metall*, 1954, 8, 169.
5. E. Gebhardt, "On An Aluminum-Rich Zinc Alloy," *Zeitschrift fur Metallkunde*, 1947, 38, 17.
6. J. Schramm, "Properties of the Wrought Alloy Zn Al_{22} Cu_6," unpublished manuscript.
7. E. Gebhardt, "On An Aluminum-Rich Zinc Alloy," *Zeitschrift fur Metallkunde*, 1947, 38, 310.
8. A. I. Blank and H. L. Burghoff, "Creep Characteristics of Phosphorized Copper (0.019 per cent P) at 300, 400 and 500° F," *Proceedings*, ASTM, 1951, 51, 984.
9. Upthegrove and Burghoff, "Elevated Temperature Properties of Copper and Copper-Base Alloys," ASTM Technical Publication No. 181, 1956.
10. E. Gebhardt, "On An Aluminum-Rich Zinc Alloy," *Zeitschrift fur Metallkunde*, 1947, 38, 57.
11. The New Jersey Zinc Co., "Zamak Alloys for Zinc Die Castings," December, 1951.

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Questions and Answers

Cores bonded with cement may cause problems . . . Requests procedure for melting high scrap manganese charges in the electric furnace . . . Oxide coating produced on gray iron by treatment with steam . . . Small cupola construction

Using Cement To Bond Cores

We would like to use either an air-dry or cement-bond sand mixture for cores which are too large for our oven. They run up to 30 in. in diam and are about 2 in. thick. Production is only about ten a day, and fast drying time is not necessary. Only the outside vertical edge and 1 to 2 in. of the bottom flat face are exposed to the metal.

We have taken this problem up with several core compound manufacturers, but since we use a concrete mixer instead of a muller for sand preparation, they would not recommend their materials. We would prefer to use cement for various reasons. At present we are using a fine-grain washed river sand which works out satisfactorily for oil-bonding.

Although your idea of using cement-bonded sand cores appears to offer a solution to your problem, we believe that you will run into other difficulties, particularly in removing such a core from the casting.

From your extremely brief description, it appears that the core essentially is a disc and is exposed to the metal only around the periphery. If the metal section is not heavy enough to heat the core to a depth of about ½ in. and destroy the bond in that portion, you will have trouble with cracking in the casting.

Assuming that the depth of core disintegration is sufficient to permit the casting to contract or pull in satisfactorily, the central portion of the core will be unaffected and will be, in foundry parlance, as hard as a brick so that it may be hard to remove.

If you want to try cement-bonded cores, however, a mixture of 100 lb of clay-free sand, 13 lb of special cement called high-early strength, and enough water to give a moisture content of 6 per cent (about 7 pints) should serve. We expect that some of the sand mix will stick to the lifts in your concrete mixer, and that should be removed before mixing another batch.

Possibly the sand you are using is too fine, and you may have to use one of 45 to 55 AFS grain fineness. Cement-bonded sand begins to set soon after being mixed, and becomes unfit for use in a little over 3 hours, so do not mix any more than can be handled in that period.

Since cement-bonded sands tend to roll away from the rammer, they should be tamped only enough to fill details of the box and eliminate soft spots. After the core is rammed, it should be turned out on a flat plate and allowed to air set for about 72 hours. You may have to allow the core to harden or set to some degree before removal, but that can be determined by experiment.

Another answer to your problem would be the use of sodium-silicate-bonded sand, which is hardened by gassing with carbon dioxide. Cores can be made rapidly and are ready for use immediately. Still another procedure would be to use your present oil-bonded sand to make the core in segments or sections which could be handled in your oven and then pasted together.

In this discussion we have assumed that the core is a solid disc; if possible, it would be worthwhile to consider using a ring core which would reduce production time and decrease amount of sand and binder required.

Melting of Manganese Steel

In our foundry in France we ordinarily produce high-manganese steel in a 1½-ton electric furnace. The charge consists of 70 per cent manganese steel scrap and 28 per cent low-carbon drop forging steel scrap (0.12 per cent C). At half charge we add 20 kg ferromanganese, 70 kg refined ferromanganese, 10 kg ferrochromium and 30 kg lime. The heat is melted under high voltage and amperage conditions.

After the heat is melted, the voltage is reduced and a reducing slag is formed by addition of coke dust and 75 per cent ferrosilicon. After working, the slag is gray-white in color. Before taking the pourability specimen, 6 kg of 45 per cent ferrosilicon is added. Heat is tapped at 1620° C.

Although this method is rapid and economical, we have trouble with pinholes in the castings, probably due to absorbed hydrogen. We will appreciate your opinion on the cause of the pinholes and how they can be avoided. We never have trouble when we use the double slag process with carbon steel scrap and addition of ferromanganese.

As you undoubtedly know, some difference of opinion exists among melters on the most suitable melting procedure, with the result that there are variations in practice, usually minor in nature.

A change in your procedure might eliminate the problem of gas holes and we suggest you try the following. Place the major portion of the ferromanganese, say 20 kg of the regular and 50 kg of the refined ferromanganese, in the center of the bottom of the furnace with the 10 kg of ferrochromium and cover it with heavy pieces of manganese steel scrap. Follow with the remainder of the manganese steel scrap, and carefully cover the charge with the drop forging scrap. Seal the furnace and melt under high power input.

When the charge is about half melted, place about 13.5 kg of lime under each electrode, seal the fur-

nace and finish the melting under a reduced power input of 1000 to 1250 kva. Make observations from time to time to see that a fairly heavy slag is maintained.

After the charge is melted, add about 5 kg of the 75 per cent ferrosilicon and sufficient lime and fluorspar mixture (six lime and one spar) to form a heavy slag. Then rabble the bath and slag and follow with a heavy dusting of coke. Seal the furnace to maintain a reducing atmosphere. Allow the bath to work about 15 minutes and rabble.

Make further additions of lime if necessary and dust with coke. Seal the furnace, making observations from time to time on the reducing conditions. Occasional dusting with a coke and lime mixture (one coke and six lime) is a good means of maintaining the desired condition. As soon as the results of the preliminary carbon are received, additions of ferromanganese are made to bring the steel up to specification, the bath stirred and the slag dusted with coke.

After sufficient time has elapsed for the alloys to melt and diffuse and the slag to function, the bath is stirred and a sample taken for the bend test. Degree of bend should be at least 120° around a 1-in. diam. If the bend is less than that, more ferromanganese is added and time allowed for melting and diffusion. If the temperature is satisfactory, the heat is tapped.

Steam Treatment of Gray Iron

We recall an article which described the effect of steam treatment on gray iron and how it vastly improved the corrosion resistance in many applications. However, we cannot locate it and wonder if you can supply any information.

Although we do not remember any recent articles, we believe the steam treatment of gray iron refers to the old Bower-Barff process which results in a black oxide coating.

Procedure is to place the castings in a furnace heated to around 1100° F and after about 10 minutes steam is injected into the furnace to displace the air. Castings remain in the furnace until they reach the 1100° temperature, are held at temperature for about 20 minutes, and then removed.

This practice is said to result in a good, adherent black oxide coating (Fe_3O_4) which is reported to provide some corrosion resistance.

Constructing a Small Cupola

Can you supply me with any information on the construction and operation of a small experimental cupola?

Small experimental cupolas with interior diameters of 3 to 15 in. have been constructed and operated at various times. In one large foundry a 21-in. cupola is employed for studying various phases of operation.

Since you do not indicate what you consider a small cupola, perhaps the 15-in. ID cupola described by Holtby some years ago might meet your requirements. The cupola will melt 30 lb per minute or 1800 lb per hour. The accompanying sketch shows the general arrangement and, of course, could be made larger or smaller by suitable changes in dimensions.

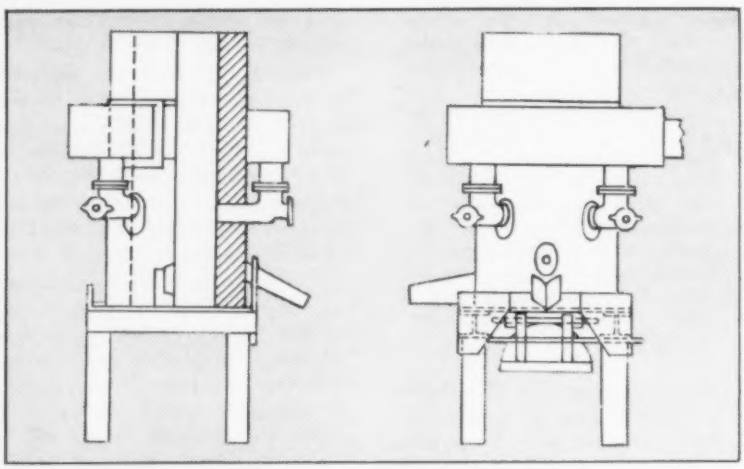
Shell of the cupola is made of two sections of steel hot water tanks 24 in. in diam. Top section is 54 in. high and the bottom 50 in. high. Bottom is welded to a $\frac{3}{8}$-in. steel plate 30 in. square containing a hole 15 or 16 in. in diam. In turn, the plate is welded to I-beams to which the supporting legs are attached. Hinged cast iron bottom doors close the opening as in the case of larger cupolas.

The cupola is lined with $4\frac{1}{2}$-in. firebrick. Windbox is horseshoe shaped, about 10 in. high, 8 in. wide, and placed above the tuyeres. Tuyeres are sections of $3\frac{1}{2}$-in.-diam steel pipe. As indicated, Holtby located the tuyeres in slots so that the height could be adjusted if desired. Slots are about 9 in. high, and the top position of the tuyeres is about 19 in. above the bottom plate. Tuyeres are attached to the windbox by downcomers.

Holtby used a special T-shape cast connection containing the peephole between downcomer and the horizontal tuyere. Air is supplied to the cupola by a centrifugal blower at the rate of 350 cfm at 4 to 10 oz pressure.

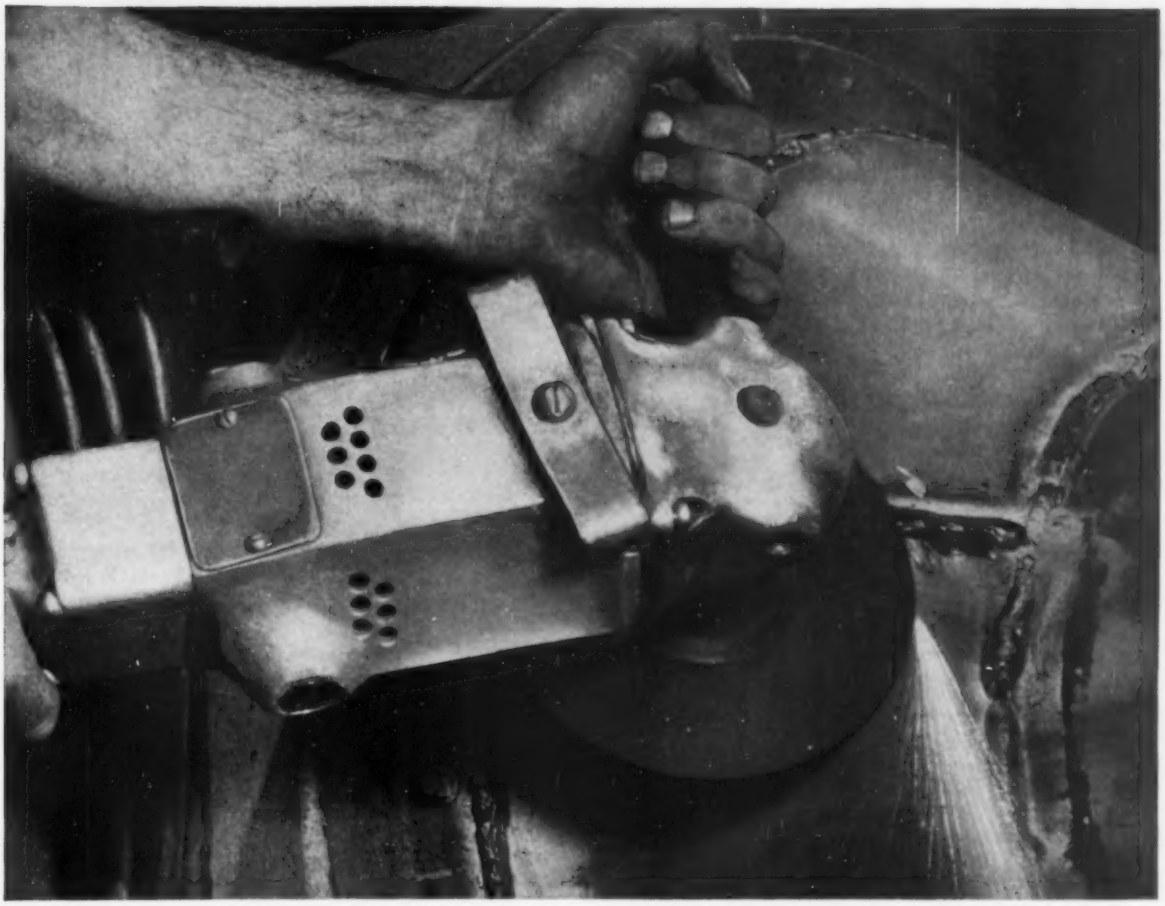
When the cupola is placed in operation, the bed height above the tuyeres is determined by the formula 10.5 times the square root of the air pressure in ounces, plus 6. That is, if the air pressure is 4 oz, the bed would be 27 in. above the tops of the tuyeres, and with an air pressure of 6 oz, the height would be 32 in. Coke between charges is held constant at 15 lb, and the iron-coke ratio may be varied from 8:1 to 10:1 depending on the nature of the iron charges. With appreciable amounts of steel scrap, the 8:1 ratio is used. Coke should be $2\frac{1}{2}$ x $2\frac{1}{2}$ x $2\frac{1}{2}$ in. or 3 x 3 x 3 in.

Essential point in operation of small cupolas is to be sure that the lining is as hot as possible before



Some of the details of a small cupola are indicated in this sketch

FLEXLITE RAISED HUB GRINDING WHEELS



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charging is begun. Heat losses in small cupolas are extremely high, and if the lining is not hot at the beginning, difficulty in melting will be encountered. Holtby recommends placing wood shavings on the sand bed (3 in. thick) and igniting them. Then dry wood is placed on the burning shavings to a height of 10 in. above the tuyeres.

When the wood is burning briskly, about 20 lb of coke is placed on the wood. The coke is allowed to burn through well, and more coke in 15-lb charges is added (with burning through) until the proper bed height is reached. With each 15-lb coke addition, 3 lb of limestone (1 in.) are included. Coke bed is allowed to soak for not less than 3½ hours and not more than 4 hours. Bed height then is checked and adjusted if necessary, the iron and coke splits charged, and melting begun.

Brass Casting Contamination

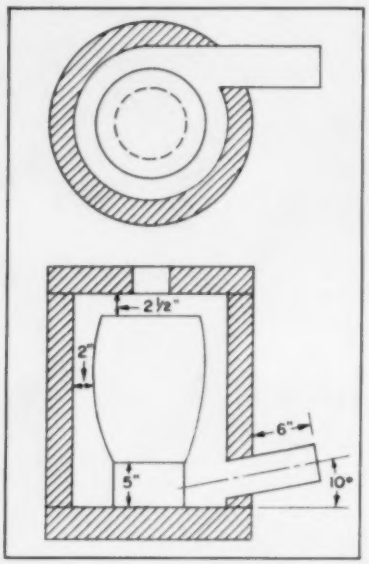
We melt 80-10-10 bronze ingot in an oil-fired No. 70 crucible furnace. On occasion our metal gives off gray to white dust on pouring, usually with considerable dross included in the casting. We have not been able to associate this condition with either a reducing or oxidizing furnace atmosphere.

If available, we also would appreciate a sketch of the proper construction of a furnace, showing the proper height of burner, crucible, etc.

From your description of the trouble with the 80 Cu, 10 Sn, 10 Pb alloy we suspect that it is contaminated with silicon, probably from the inadvertent addition of some silicon brass or bronze to the ingot charge placed in the crucible. The silicon reacts with the lead to form lead silicate. Usually the castings have a rough surface and appear as though they have been whitewashed. Lead sweat also occurs.

As to your request for furnace construction details, we believe you will be much better off purchasing one than trying to build your own since the furnace manufacturer designs the units to provide rapid and efficient melting.

If you want to experiment, however, some details are proposed in the accompanying sketch. The combustion tunnel enters tangentially to the circumference and at an angle of about 10° from the horizontal, and arranged so that the axis strikes the center of the pedestal or block supporting the crucible. While we have indicated a 2-in. space between crucible and wall, it should be only sufficient to permit placing the tongs around the crucible.



Proposed design for crucible furnace fired by oil or gas

Formulation of Dip Coatings

In reading the July issue I noticed a reference to dip coating formulations for the investment casting process. Since literature on that subject is practically nonexistent, I will appreciate any aid on use of sodium silicate and ethyl silicate in dip coat formulations, and representative dip-coat formulations using either of those materials.

Information on the hydrolysis of ethyl silicate preparatory to use in dip coats and investments is available in publications prepared by the several producers and we suggest you obtain one of those.

A commonly used type of ethyl silicate is the condensed grade containing about 28 per cent silica. It is formed into a hydrolyzed stock solution with good shelf life by stirring 15 parts by volume into a mixture of 8 parts of denatured ethyl alcohol and 2 parts of 1 per cent hydrochloric acid. That mixture must be allowed to stand for at least two hours before use, and when used further water is added to control the setting time.

Not too much information is available on sodium silicate binder but presumably the various producers could supply it. One suggested mixture contains 50 parts by volume of 40° Be sodium silicate, 150 parts water, 2 parts concentrated hydrochloric acid, and ½ part wetting agent. If defoaming is required, add 0.1 per cent 2-ethylhexanol; if a plasticizer is needed add 5 per cent glycerine, and for thickening add 0.5 per cent hydroxyethyl cellulose.

As might be expected, details relative to refractories, their fineness, and combinations are not freely available since many investment casters develop their own formulations and are reticent about disclosing them. However, some dip-coat formulations in the literature follow: Two using ethyl silicate are formed, respectively, of 8 parts by weight of china clay, 12 parts 120-mesh silica, 10 parts of the previously mentioned hydrolyzed ethyl silicate, and 1 part water; 6 parts silica flour, 12 parts 120-mesh silica, 2 parts chrome oxide, 8 parts ethyl silicate, and 1 part water.

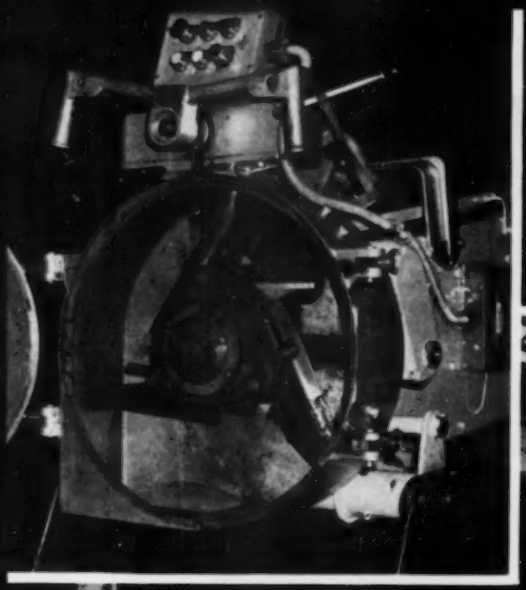
A British formulation for spray coating contains 100 grams 200 mesh zircon flour, 17 cc ethyl silicate stock solution, 29 cc industrial methylated spirits, 5 cc hydrochloric acid solution. The latter is 10 per cent acid by volume in methylated spirits. The stock ethyl silicate solution is composed of 75 per cent by volume of condensed ethyl silicate, 7 per cent water, and 18 per cent ethyl alcohol.

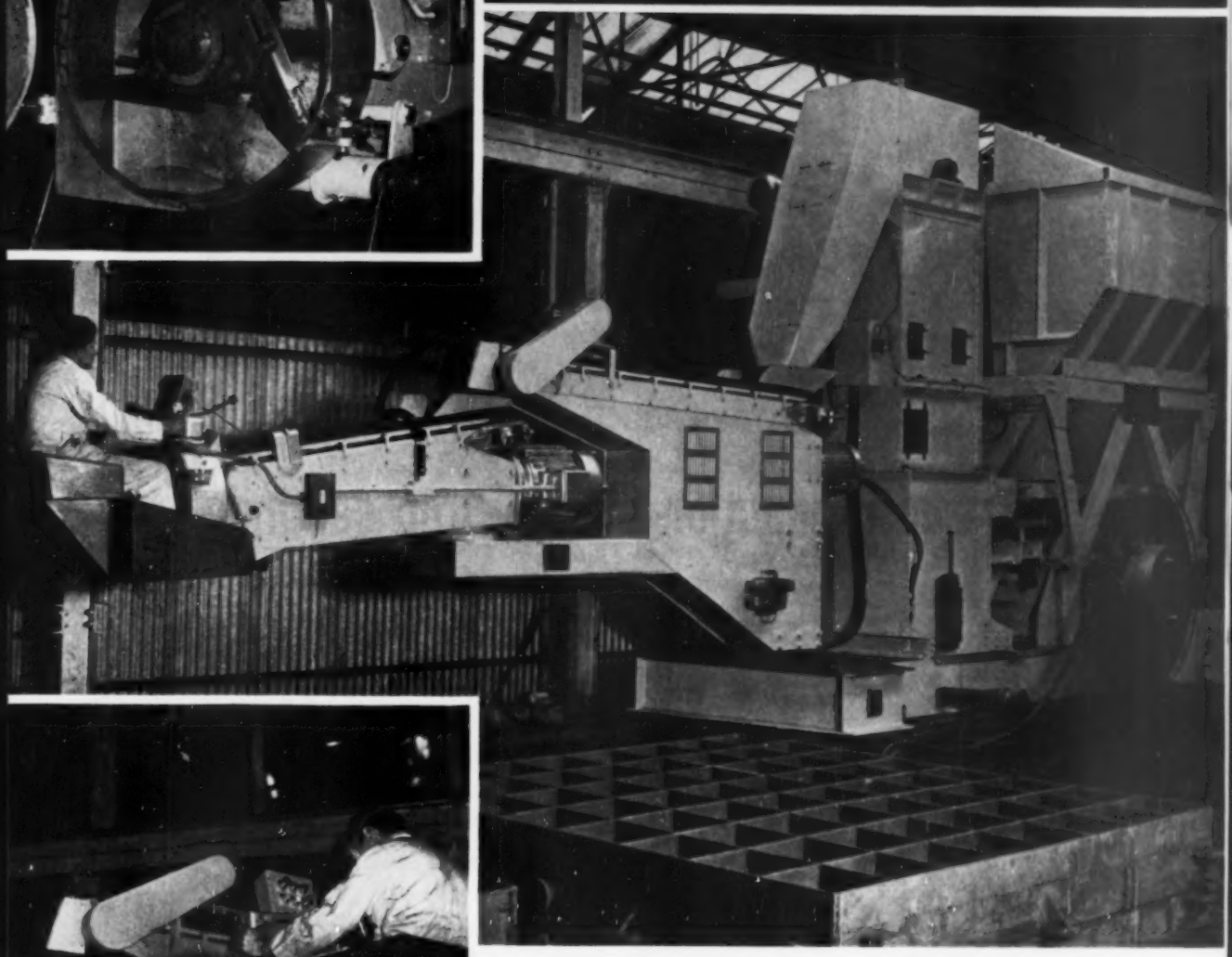
Dip coats using sodium silicate include 8 parts by weight of china clay, 12 parts 120 mesh silica, and 13.7 parts sodium silicate binder mentioned earlier; 6 parts silica flour, 12 parts 120-mesh silica, 2 parts chrome oxide, and 9.6 parts sodium silicate binder; and 6 parts silica flour, 12 parts 120-mesh silica, 2 parts iron oxide, and 11 parts sodium silicate binder.

With those formulations as a base you can experiment with different refractories in various grinds and combinations.

Circle 599 on Page 85→

No. 4 Mobile SANDRAMMER





FENAL's newest contribution to Sandramming Practice! This self-powered No. 4 Mobile has Patented 24" "Turbo-Ram" head. Operating radius is 15'. Feed unit includes 7½ ton drop bottom tank and spare tank, with full automatic control from head. Output up to 2000 lb. per minute. This model is also designed as a stationary unit. Our No. 3 Sandrammer has a 10' radius, with head operated by hydraulic power or remote control. If super size work require them, longer jibs are available.

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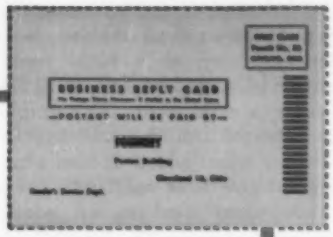


What's New in Equipment and Supplies

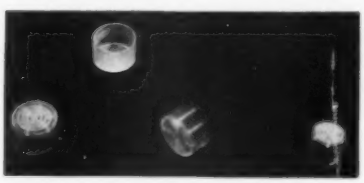
THERMOSETTING CEMENT

Thermosetting carbonaceous cement is pre-mixed and supplied in a single package. It is reported to eliminate stirring of components on the job and to assure uniform behavior in its performance. This cement is available in a range of consistencies. Characteristics include good bonding strength and low curing temperature.—**Electrode Div., Great Lakes Carbon Corp.**, 18 E. 48th St., New York 17, N. Y.

For More Details Circle No. 469—Page 85

NYLON COREBOX VENT

Self-cleaning nylon vent reportedly cannot be damaged by crushing or hammering and allows tight fitting in holes as much as 0.010 in.



oversize. It will not be harmed or warped by hot or cold solvents and may be cleaned with a direct blast of live steam. Vent slots are a series of concentric circles.—**Martin Engineering Co.**, Neponset, Ill.

For More Details Circle No. 470—Page 85

RELEASE AGENT

Dylube 909, a water-extendable zinc diecast release agent, is a true emulsion: The oil-water mixture will not separate. For this reason, no "dancing" occurs when it is applied to a hot die cavity. Advantages include a sufficient alkaline reserve to insure that no flipping to the acid side occurs under sustained high temperatures that could cause pitting and the elimination of fire hazards because of the water base. Special feature of the agent is its ability to be extended with a solvent as well as water.—**American Charcoal Co.**, 201 S. Green St., Detroit 17, Mich.

For More Details Circle No. 471—Page 85

SAFETY GLASSES

Lightweight protective glasses are said to combine attractive styling, featherweight protection, and low cost. Operations where Safety Specs are recommended include spot welding, buffing, handtool operations, and inspection.—**General Scientific Equipment Co.**, Limekiln Pike & Williams Ave., Philadelphia 50, Pa.

For More Details Circle No. 472—Page 85

GRAPHITE PARTICLES

Small particle size of Black Velvet plumbago makes it adhere well when

Test Unit Measures Electrical Conductivity

Eddy current instrument for nonmagnetic metals measures electrical conductivity to determine hardness, alloy, and heat treat condition; sort mixed metals; and check tensile strength of aluminum. Readings can be taken on a comparative basis using known samples or in absolute electrical conductivity units as a per cent of the International Annealed Copper Standard.

This 3⅜ x 3¾ x 6½-in. instrument weighs only 4½ lb and can be used for both production and on-site testing. Three volts from two standard flashlight batteries power the self-contained unit. A built-in battery checker indicates whether the batteries

meet the required operating voltage range. — **Magnaflux Corp.**, 7300 W. Lawrence Ave., Chicago 31, Ill.

For More Details Circle No. 495—Page 85

the material is rubbed or brushed dry on green sand molds. It can be used dry as a mold coating or mixed with molasses water and used as a mold wash. This graphite is reported to increase heat resistance when added to core washes and to give heat resistance to each grain when used as an additive to sand.—**Frederic B. Stevens, Inc.**, 1800 Eighteenth St., Detroit 16, Mich.

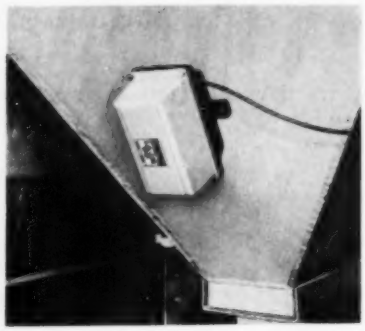
For More Details Circle No. 473—Page 85

BIN VIBRATORS

V3A-50P and V3A-50S vibrators are for use on bin walls of ¼ in. maximum thickness with a capacity of 50 cu ft. The 50P is of the impact type, where the vibratory output is in the form of steel on steel, and 50S is semi-noiseless, with a semi-resilient impact element to provide cushioned impact.

No control box or rectifier is needed to provide for power conversions from dc to ac, but a simple control box is recommended so that the vibrator can be adjusted easily to day-by-day variations in product or loading conditions.—**Eriez Mfg. Co.**, Erie, Pa.

For More Details Circle No. 474—Page 85



PORTABLE AIR HOISTS

Two lightweight, portable air hoists which can be moved and installed by one man are said to conserve time, reduce operating costs, and remove pressure from the shop crane. The 1000-lb capacity unit weighs 39 lb and lifts its rated load at 45 fpm; the 2000-lb unit weighs 56 lb and lifts its rated load at 22 fpm. Aluminum alloy housing measures 12½ in. over-all length, 5¼ in. in diam, and takes up little headroom.

A mechanically operated brake is applied automatically whenever the controls are released and controls lowering of the load if the air supply is shut off. The air motor is completely enclosed and cannot burn out even when stalled completely. — **Ingersoll-Rand Co.**, 11 Broadway, New York 4, N. Y.

For More Details Circle No. 475—Page 85

SCALING TOOL

BR series scalers can be used for general scaling, beading, and

peening. Push throttle, lever throttle, and BV-type handles are available. Tool noses are replaceable. Scaler barrels are interchangeable between all models and they are designed to use all generally accepted makes of quarter-octagon chisels. A new short backhead in the LT model results in more compactness. A flange on the throttle of PT models is designed to facilitate depression of the throttle for operation.—**Cleco Air Tools Div., Reed Roller Bit Co.**, 2503 Robinhood, Houston, Texas.

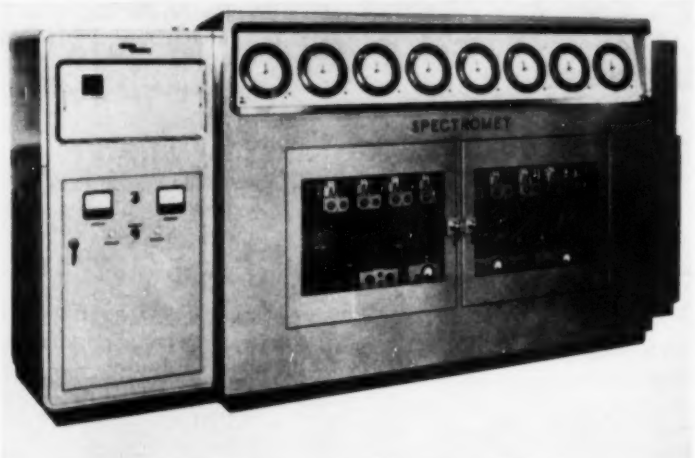
For More Details Circle No. 476—Page 85

INDUSTRIAL HEATERS

Industrial heaters in the company's OG series are available in output ranges of 280,000 Btu per hr and higher, with oil, gas, or combination fuel burners. They are designed for either unit heater or central applications.

Engineering features include an integrated burner design with dual-fuel burner. For combinations, gas and oil are introduced at different points in the same firing assembly, with instant changeover by a single switch. Units are built in two sections, permitting either blower or furnace sections to be used individually. Floor, inverted, and hori-

Unit Analyzes More Elements Simultaneously



Spectromet direct-reading spectrometer has been re-engineered and improved to allow a greater number of elements to be analyzed at one time. Chemical composition of metal samples can be determined in less than 1 min, with the results presented directly in per cent concentration on indicator dials.

No special laboratory is required; the spectrometer permits installation close to the melt shop or production floor. The optical servo monitoring system compensates for variations in temperature and atmospheric pressure as well as the effects of shock or vibration.

Electronic components are protected against humidity, and optical system is shielded against corrosive fumes. The device is compact and completely shock mounted. — **Baird-Atomic, Inc.**, 33 University Rd., Cambridge 38, Mass.

For More Details Circle No. 496—Page 85

Circle 601 on Page 85→

For truly engineered, truly trouble-free bronzes, specify Federated Silicon Bronzes (50% better ductility, tensile strength up to 65,000 psi); Aluminum Bronzes (heat treated, tensile strength as high as 120,000 psi, with correspondingly high yield strength); and Manganese Bronzes (as-cast tensile strength 125,000 psi, good ductility, high hardness). Federated Engineered Bronzes are the end results of highly perfected production techniques and continuous quality control procedures developed by experienced metallurgists in Asarco's Central Research Laboratory. Ask your Federated field man about Engineered Bronzes and Federated's complete line of quality-controlled copper base casting alloys. Federated Metals Division, 120 Broadway, New York 5. In Canada: Federated Metals Canada, Ltd., Toronto and Montreal.

FEDERATED METALS DIVISION OF

ASARCO

AMERICAN SMELTING AND REFINING COMPANY

zontal models are available. Air diffusion nozzles can be turned for the air direction desired, or the unit can be adapted for duct distribution systems. — **Lennox Industries Inc., Industrial Div.**, 1701 E. Euclid, Des Moines, Iowa.

For More Details Circle No. 477—Page 85

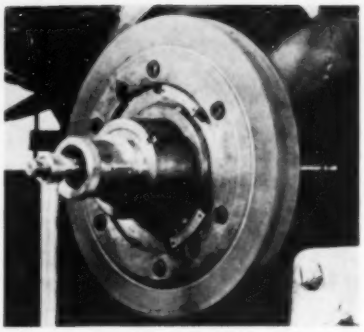
SAND RECLAIMER

Ball mill sand reclaimer is designed to recover sands bonded with oil, sodium silicate, resin, or cement. Recovery efficiency is about 80 per cent. After lumps of core or mold sand are broken in the mill, the sand falls through a perforated plate and then through a screen. Reusable sand is discharged from the bottom of the unit after passing through a baffle plate air chamber where dust is removed. Screens of different mesh sizes are interchangeable to handle sands of different sizes. Reclaimers are available in five sizes with hourly capacities of 900 to 11,000 lb.—**Steinlein & Kunze GMBH**, Maschinenfabrik, Koblenz-Metternich, Germany.

For More Details Circle No. 478—Page 85

GRINDING WHEEL BALANCER

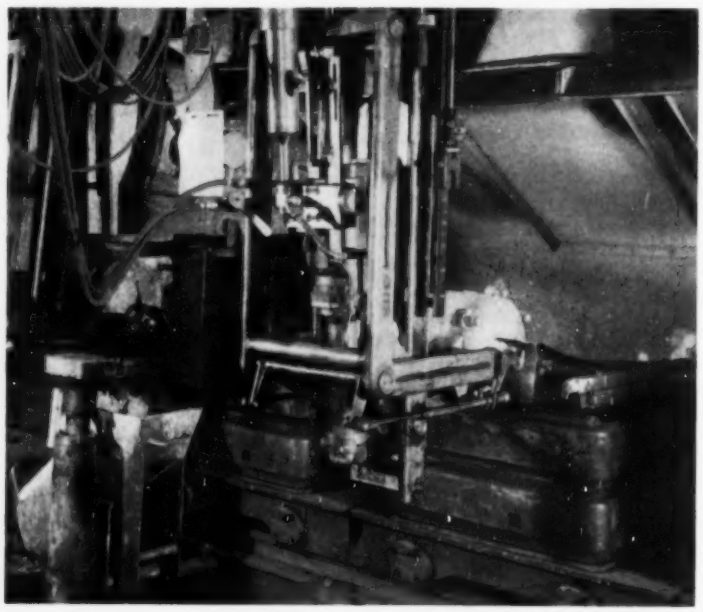
Portable balancer for grinding wheels offers fast, accurate balancing of grinding wheels without removing the wheel from the grinder. Once the hub and wheel are in positon, balancing of the wheel is achieved in minutes by use of a set of three adjustable weights inserted in the hub. These weights



are infinitely adjustable, and the two balance screws permit micrometer adjustment of the weight. Balancers for internal, external, centerless, and center grinding machines will be among those included in the line.—**Aero Supply Mfg. Co., Inc.**, Corry Pa.

For More Details Circle No. 479—Page 85

Automatic Pouring Eliminates Human Error



Buhrer automated pouring system features a tilting mechanism which permits rotating the pouring ladle around a virtual axis located near the lip of the ladle. The pouring lip remains at a minimum height above the pouring basin throughout the pouring process.

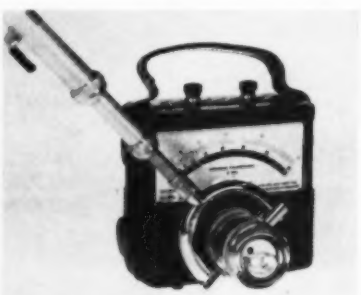
Other features of the system are a double valve arrangement which permits separate tilting speed adjustments for both tilt-on and hold-full pouring, an automatic metal weighing device to assure that the correct amount of metal is poured into every mold, and a stopper-operated holding ladle to insure that slag-free metal is supplied to the small pouring ladles.

Rapid filling of the enlarged pouring basin is said to prevent slag from entering the downgates of the molds.—**International Automation Corp.**, 121 Huron View, Ann Arbor, Mich.

For More Details Circle No. 497—Page 85

SURFACE PYROMETER

SP surface pyrometer reads surface temperatures directly to an accuracy of $\pm 3/4$ per cent. Operation is said to be simple, noncritical, and fully accurate; measuring range of the head is 200 to 2400° F.



Auxiliary indicating and recording instruments are available.—**Atlantic Pyrometers, Inc.**, 190 Warburton Ave., Hawthorne, N. J.

For More Details Circle No. 480—Page 85

ALUMINA PLASTIC REFRACTORY

Pitco 80 is an 80 per cent alumina plastic refractory said to combine the advantages of monolithic and plastic construction. It is air and gastight, does not require special shapes, has high thermal shock resistance, withstands heavy loads and temperature variations, and delivers long life, according to the manufacturer.

The material is recommended to balance refractory linings in high-temperature furnace installations and to install where iron oxides and

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406	436	466	496	526	556	586	616	646	676	706	736	766	796	826	856
407	437	467	497	527	557	587	617	647	677	707	737	767	797	827	857
408	438	468	498	528	558	588	618	648	678	708	738	768	798	828	858
409	439	469	499	529	559	589	619	649	679	709	739	769	799	829	859
410	440	470	500	530	560	590	620	650	680	710	740	770	800	830	860
411	441	471	501	531	561	591	621	651	681	711	741	771	801	831	861
412	442	472	502	532	562	592	622	652	682	712	742	772	802	832	862
413	443	473	503	533	563	593	623	653	683	713	743	773	803	833	863
414	444	474	504	534	564	594	624	654	684	714	744	774	804	834	864
415	445	475	505	535	565	595	625	655	685	715	745	775	805	835	865
416	446	476	506	536	566	596	626	656	686	716	746	776	806	836	866
417	447	477	507	537	567	597	627	657	687	717	747	777	807	837	867
418	448	478	508	538	568	598	628	658	688	718	748	778	808	838	868
419	449	479	509	539	569	599	629	659	689	719	749	779	809	839	869
420	450	480	510	540	570	600	630	660	690	720	750	780	810	840	870
421	451	481	511	541	571	601	631	661	691	721	751	781	811	841	871
422	452	482	512	542	572	602	632	662	692	722	752	782	812	842	872
423	453	483	513	543	573	603	633	663	693	723	753	783	813	843	873
424	454	484	514	544	574	604	634	664	694	724	754	784	814	844	874
425	455	485	515	545	575	605	635	665	695	725	755	785	815	845	875
426	456	486	516	546	576	606	636	666	696	726	756	786	816	846	876
427	457	487	517	547	577	607	637	667	697	727	757	787	817	847	877
428	458	488	518	548	578	608	638	668	698	728	758	788	818	848	878
429	459	489	519	549	579	609	639	669	699	729	759	789	819	849	879
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molten aluminum are prime causes of failure. It is used in aluminum reverberatory furnaces, crucible furnaces, around electrodes in electric furnace roofs, in desulfurizing forehearths, holding ladles, and other applications.—**Refractories Div., H. K. Porter Co.**, Porter Bldg., Pittsburgh 19, Pa.

For More Details Circle No. 481—Page 85

AIR HOIST

Quik-Lift Air Hoist has a heavy-duty, reversible rotary air motor, an air-cooled disc brake, and sensitive controls. Models are available with either link or roller chain and with interchangeable manual cord control or pushbutton pendent

control. Pendent control levers are recessed to prevent accidental operation. Safety valve stops hoist if pendent hose breaks or disconnects.

Pin-point load spotting is achieved through smooth power flow and sensitive control at all speeds, up or down, with full load. Capacities are 500, 1000, and 2000 lb.—**Coffing Hoist Div., Duff-Norton Co.**, 800 Walter St., Danville, Ill.

For More Details Circle No. 482—Page 85

NOZZLES AND TUBING

Vycor brand 96 per cent silica glass is used for transparent nozzles for welding torches and protective tubing for thermocouples. It is designed to withstand heat, thermal shock, and corrosion.

The glass nozzle has an inside ground joint which eliminates need for a gasket. It fits over the welding point, allowing free flow of gas to the spot of the weld. Its transparency permits the welder to see his work.

As a protective shell around a thermocouple, the glass goes di-

rectly into molten metal in electric arc and open-hearth furnaces, where it withstands short-term temperatures up to 3100° F.—**Corning Glass Works**, Corning, N. Y.

For More Details Circle No. 483—Page 85

GREASE ADDITIVE

New MoS_2 dispersion dag 208, provides great coverage, uniformity, and handling ease. This molybdenum disulfide additive for greases and heavy oils is said to achieve greater effectiveness at a lower solids content, extending the range of applications to even closer-tolerance mechanisms.—**Acheson Colloids Co.**, Port Huron, Mich.

For More Details Circle No. 484—Page 85

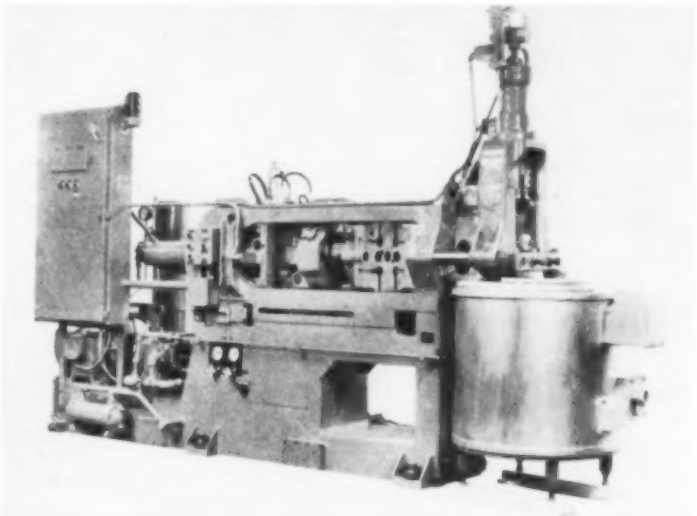
ROTARY AIR COMPRESSORS

Rotary air compressors feature Perma-Vane rotor blades, which are said to have substantially greater wear resistance than those ordinarily used. Their freedom from deterioration and breakage are claimed to prevent serious compressor damage and prolong life. Less horsepower is required because of the light weight and minimum friction of the blades.

The new line includes compressors with displacements of 8 to 650 cfm. Units are available in 2 to 125-hp sizes. These compressors are built for continuous use and may be operated at pressures up to 125 psig.

They are lightweight and compact and are reported to have 50 per cent fewer working parts than

125-Ton Machine Diecasts Zinc Automatically



HP-½Z-SF 125-ton automatic diecasting machine will cast up to 6¾ lb of zinc and will provide over 1000 free cycles per hour. Source of this speed is a 25-hp motor and a 2750-cu-in. accumulator. Dies up to 16 in. high requiring a 9-in. opening can be accommodated.

Standard features include central screw die height adjustment up to 3 in., automatic cycling, low pressure die closing circuit, and air-operated die clearing assembly. This machine is offered with unit steel frame construction.—**Lester-Phoenix Inc.**, Dept. N-14, 2711 Church Ave., Cleveland 13, Ohio.

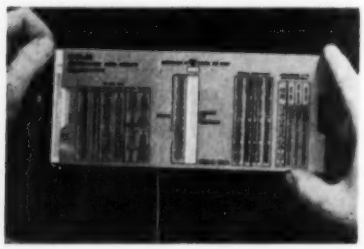
For More Details Circle No. 498—Page 85

other units of the same capacity. All are completely enclosed, with no exposed belts or couplings.—**Davey Compressor Co.**, Kent, Ohio.

For More Details Circle No. 485—Page 85

CALCULATOR

Plastic silde-chart calculator is reported to provide a time-saving, error-reducing method of determining shrinkage and draft values. It comes in pocket size, and includes



charts of tap drill sizes, decimal tables, and other frequently used data.—**Kelm Mfg. Co.**, Coloma, Mich.

For More Details Circle No. 486—Page 85

ELECTRIC LIFT TRUCK

Hustler DTL series standup electric lift truck features compact design with full vision of forks from the driving position. This unit also offers direct steering on roller-mounted 15½-in. ring gear, quick maintenance of electrical contacts and hydraulic controls, optional 360-degree steering, and rigid construction.

Furnished in 2000 and 3000-lb capacities on 24-in. load centers, the truck has a turning radius of 50 in., inching control, and reverse and four forward speeds to 6 mph.—**Heifred Corp.**, Church & Elm Streets, Willoughby, Ohio.

For More Details Circle No. 487—Page 85

PLUNGING LADLES

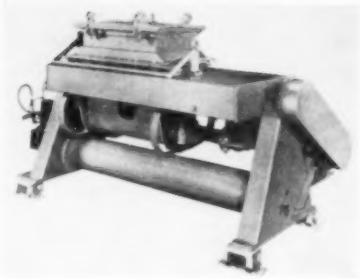
Magnesium alloy plunging ladles are designed for use with new technique for producing nodular iron. They are said to lower cost of treatment, improve control, help prevent excessive slag, and to eliminate smoke and flame.

These ladles are made in eight capacities, from 1000 to 6000 lb.—**Industrial Equipment Co.**, 275 Ohio St., Minster, Ohio.

For More Details Circle No. 488—Page 85

FINISHING VIBRATOR

15-hp Lorco vibrator for precision finishing will clean, descale, deburr, radius, fine finish, color, burnish, or ball burnish. The rubber-lined bowl is mounted on coil and leaf springs and vibrated by an eccentric shaft. Drive speed is continuously variable over a range of from 0 to 2100 rpm. Electric controls prevent operation with adequate lu-



brication. Other controls prevent the drive motor from reversing before the bowl has come to a complete stop. The eccentric shaft is enclosed by a safety guard. Bowl has a volume of 6.92 cu ft. **Lord Chemical Corp.**, 2068 S. Queen St., York, Pa.

For More Details Circle No. 489—Page 85

SAFETY HEADGEAR

Fiber glass, aluminum, and electrical (plastic) safety hat and caps feature a polyethylene suspension which gives minimum 1¼ in.

clearance between crown and hat shell, yet maintains adjustment provisions for comfortable crown depth fit. Although the suspension is removed or replaced with snap-in slots, it can be left intact for cleaning and sterlization. All three lines are resistant to water, moisture absorption, or corrosion and exceed safety standards.—**Safety Div., Boyer-Cambell**, 6540 St. Antoine St., Detroit 2, Mich.

For More Details Circle No. 490—Page 85

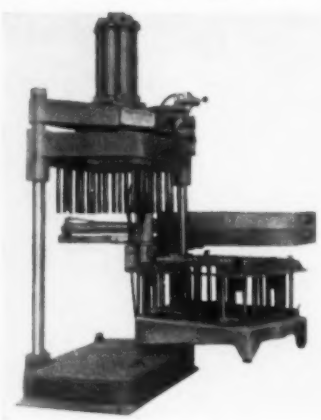
ULTRASONIC FLAW DETECTOR

Sonoray Model 5 unit uses the pulse-echo system for flaw detection and thickness measurement. Ultrasonic pulses are sent intermittently into the material under test and, together with the returning echo, are displayed on a cathode-ray tube. Variations in the normal pattern indicate a flaw or discontinuity. The unit can be used for con-

Shell Mold Bonding Unit Cuts Casting Loss

Liquid resin applicator for bonding shell mold halves is said to increase available bonding areas, regardless of casting contour. Uniformity of drop, accuracy of placement, and penetration of resin are features of the applicator. The unit is designed to provide shell molded castings with a closer tolerance through the parting line, to eliminate resin drift into mold cavities, and to prevent runouts and excessive finning. Accurate placement of resin also makes it possible to set cores before resin application. This sequence of operations avoids the possibility of the resin's presetting.

Applicator bonders are available for shell molds 15 in. x 20



in. and 20 in. x 30 in.—**Shell Process Inc.**, Bliss and Parkside, W. Springfield, Mass.

For More Details Circle No. 499—Page 85

RESTORE COSTLY COPPER COMPONENTS TO FULL EFFICIENCY at a fraction of replacement cost

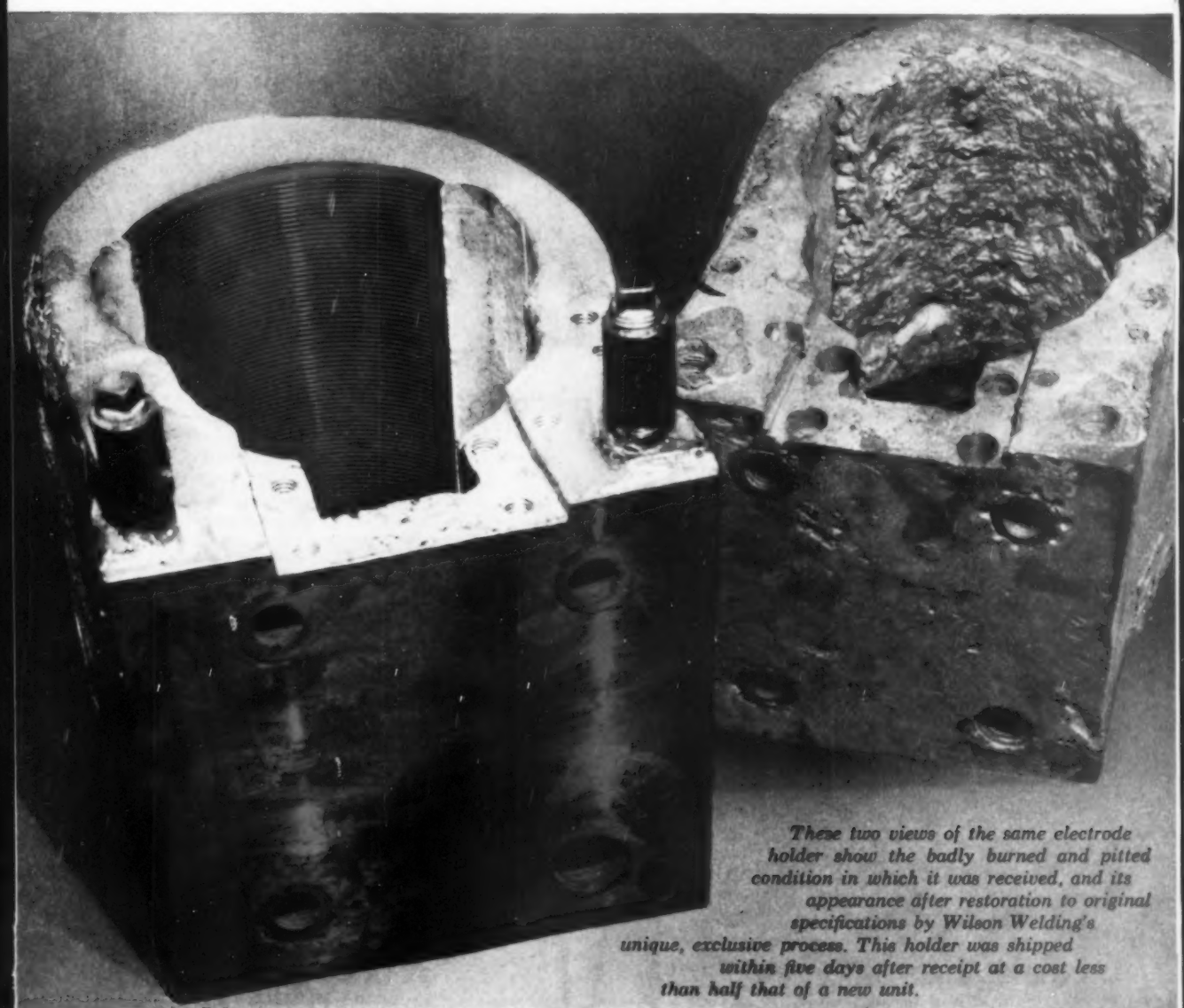
ELECTRODE HOLDERS, BUS TUBES, CABLE CLAMPS, TUYERES

Foundry operators throughout the industry are saving literally thousands of dollars by taking advantage of Wilson Welding Company's patented process for rebuilding costly copper electrode holders, bus tubes, cable clamps and tuyeres.

After being restored to original specifications, or modified to meet your requirements, such items are guaranteed to perform and give life expectancy equal to that of new units and at substantial savings. Repair prices are based upon the amount of labor and material cost involved and rarely equal 50 per cent of replacement cost.

Prompt service reduces costly down time. Ordinarily jobs are completed and shipped within five days after receipt. In emergencies this service can be accelerated to meet your requirements.

Don't discard or scrap badly burned, pitted or scarred units. They are costly and can be salvaged. Write or call Wilson Welding Company, Inc. for cost estimate or additional information without obligation.



These two views of the same electrode holder show the badly burned and pitted condition in which it was received, and its appearance after restoration to original specifications by Wilson Welding's unique, exclusive process. This holder was shipped within five days after receipt at a cost less than half that of a new unit.

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Circle 602 on Page 85

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...CRYSTOLON* Silicon Carbide

Impact on a charging hearth . . . a surge of molten metal into a trough . . . attack by corrosive alloys, fluxes and slags . . . Norton CRYSTOLON Refractories stand up to *all* these rigors of aluminum melting and transfer operations. Their exceptional stamina and stability not only protect purity throughout critical processing but also sharply reduce refractory maintenance.

Small wonder. CRYSTOLON Refractories are the most resistant to corrosion and erosion of all known refractories — and they offer outstanding mechanical strength and the highest resistance to thermal shock.

Ideal for use at all key melting, holding and transfer points, CRYSTOLON Refractories are specifically recommended for reverberatory and induction type furnaces. On the melting hearth, in the hot wall, in the holding hearth, and in many other critical areas, they assure longer refractory life . . . cleaner metal, free from refractory inclusions. What's more, CRYSTOLON Refractories are not wet under these corrosive conditions. Refractory surfaces stay clean longer . . . last longer.

Use these versatile refractories wherever aluminum could cause costly trouble . . . wherever contamination is a threat: in melting areas, launders, spouts and simple valves . . . for tap blocks and stopper rods. Take full advantage of today's high purity pig . . . *protect* purity during *your* operations. Reduce your reject losses with Norton CRYSTOLON Refractories. Several types are available to meet your precise requirements: oxide-bonded CRYSTOLON "G"; nitride-bonded CRYSTOLON "N" and recrystallized CRYSTOLON "R" Silicon Carbide. For complete details, write NORTON COMPANY, Refractories Division, 309 New Bond Street, Worcester 6, Mass.

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tact or immersion work. It is equipped with handles which fold up and over the cabinet, and one man can carry it easily. A broadband amplifier permits a continuous range of test frequencies so that the instrument automatically adjusts to any transducer within its operating range, which is 0.4 to 10 mc.—**Branson Instruments Inc.**, 40 Brown House Rd., Stamford, Conn.

For More Details Circle No. 491—Page 85

MAGNESIUM ALLOY

Magnesium-rare earth metal alloy EK31XA sand castings for missile applications are said to combine good room-temperature tensile properties with excellent tensile strength at temperatures up to about 600° F. They also exhibit excellent creep resistance at these temperatures for periods of time up to 10 hr. In long-term properties, including creep strength up to 1000 hr, sand castings in this alloy are serviceable to about 450° F. The alloy has good castability, can be welded by argon-arc or heli-arc methods, and can be finished with standard magnesium finishing systems. Composition is 3.2 per cent rare earth metal (didymium), 0.6 per cent zirconium, balance magnesium.—**Dow Chemical Co.**, Midland, Mich.

For More Details Circle No. 492—Page 85

OPEN GEAR LUBRICANT

Gredag 98 is an open gear lubricant which is claimed to be a superior material to combat adverse weather conditions. It is compounded to insure freedom from dripping, thinning, and throw-off in service, and its wear resistance extends the period of efficient gear operation between each lubrication. The material is easy to apply at low temperatures and retains plasticity below freezing. A spouted caulking type cartridge eliminates waste and contamination and can be used in an inexpensive caulking gun.—**Gredag Dept., Acheson Colloids Co.**, Port Huron, Mich.

For More Details Circle No. 493—Page 85

LAMINATED TIRES

Laminated nylon premium tire for material handling equipment is made with softer rubber to assure easier riding. Its operational benefits are said to include even wear, easy steering, elimination of downtime, superior traction, and prevention of flats since it uses no tube or air. It is designed to produce a smooth, troublefree ride even over rough surfaces and to provide long life.—**Notat Tire Co.**, 1504 E. 34th St., Chattanooga, Tenn.

For More Details Circle No. 494—Page 85

AUTOMATIC TRANSFER DEVICE

Places and Removes Mold Weights

● MOLD CLAMPING and manual handling of weights have been eliminated on a casting line at the gray iron foundry of the Indianapolis Truck Engine Works, International Harvester Co., by a device called the Weight-Shifter.

This unit, a development by Planet Corp., Lansing, Mich., gently places weights on molds and later removes them. Operation is completely automatic, and the device can accommodate up to 400 molds an hour.

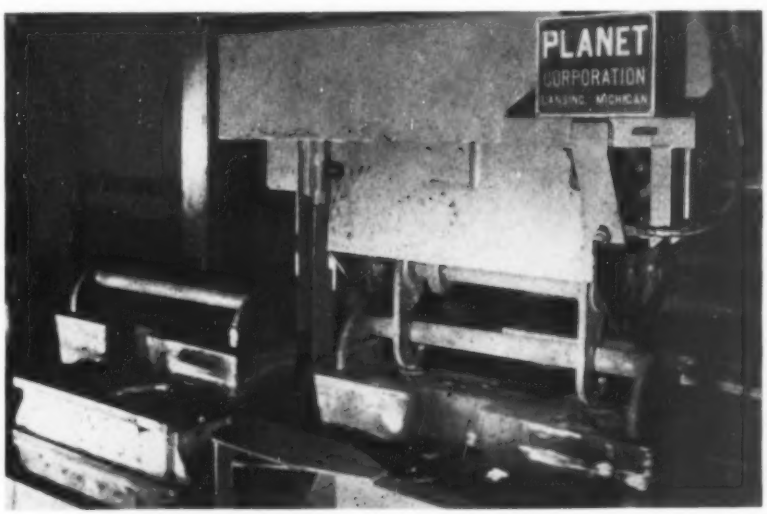
Currently operating on an 18-second cycle at the Indianapolis foundry, the Weight-Shifter intersects the casting line at a 90-degree angle just before pouring. As a closed mold approaches the device, the mold trips a switch which activates the loader mechanism.

The loader hook engages a weight, lifts it up, out, and over the mold, and places a 900-lb weight on top of the mold while it is moving along the line. Weight placement is said to be so soft that it never jars the mold and so accurate that it never obscures the pouring basin.

After the mold has been poured and cooled, it passes by the rear end of the shifter, where the weight is retrieved by a similar operation. The weight is picked up from the mold, set down on a powered roller flight conveyor within the machine, and carried to the loading end to await its next trip. The roller flight conveyor also serves as a live float for weights.

The unit is designed for maximum flexibility and is adaptable to old lines as well as to new. Weight discharge height, for instance, can be adjusted automatically to compensate for variations in mold sizes. Weights of any reasonable size can be used, and vertical dimensions can be altered to clear existing equipment.

For More Details Circle No. 500—Page 85

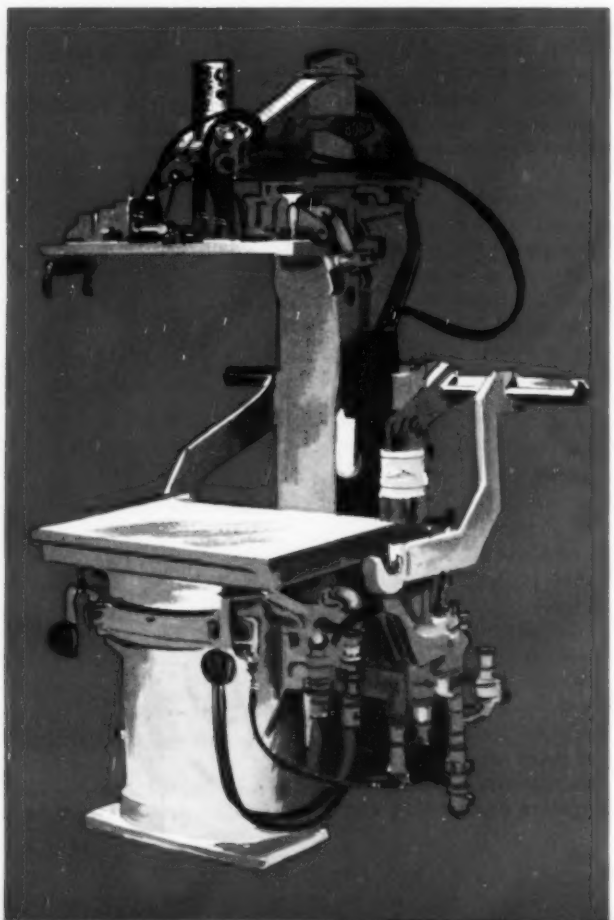


Weight-shifting device gently places weight on a mold. It also removes the weight after the mold has been poured. Note other weights at the right rear

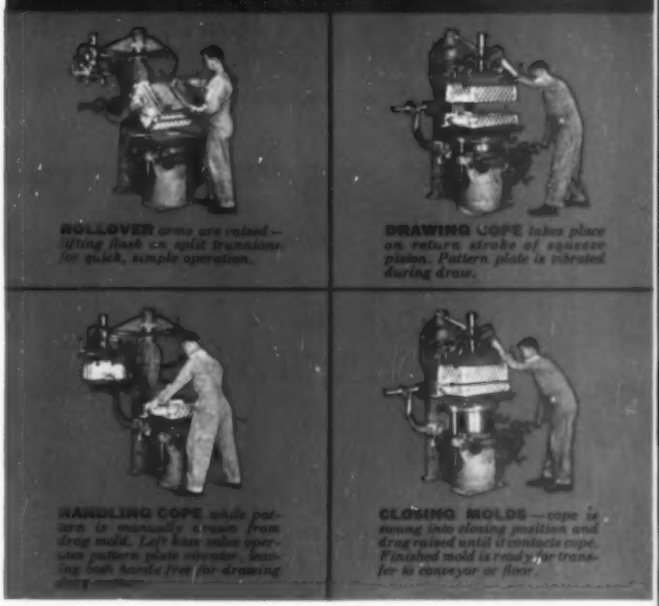
Here's how one man . . .

. . . one **OSBORN ROTA-LIFT®** . . .

can turn your large match-plates into profits!



Here's how the OSBORN ROTA-LIFT mechanizes match-plate molding



ROLLOVER *arms are raised — lifting flask on split trunnions for quick, simple operation.*

DRAWING COPE *takes place on return stroke of squeeze piston. Pattern plate is vibrated during draw.*

HANDLING COPE *while pattern is manually drawn from drag mold. Left hand raises operates pattern plate elevator, leaving both hands free for drawing.*

CLOSING MOLDS *— cope is swung into closing position and drag raised until it contacts cope. Finished mold is ready for transfer to conveyor or floor.*

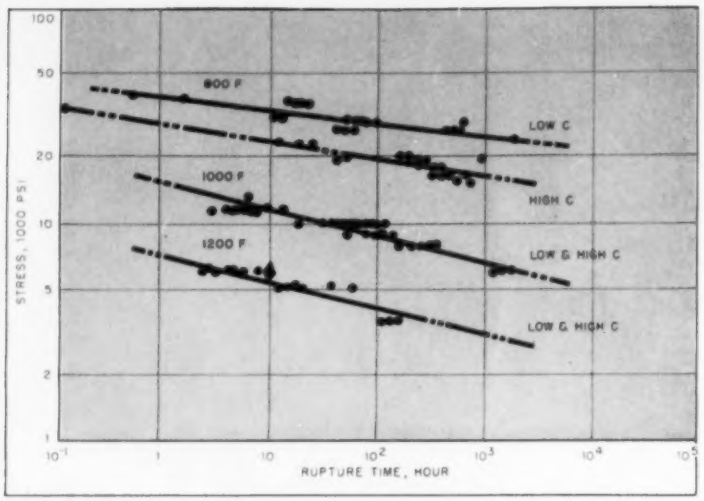
MOLDS formerly considered too large for match-plate molding can be handled on the Osborn Rota-Lift. With the Rota-Lift one man performs *all* the operations that once required two men. But that's not all. Molds are of uniform quality... and there's less operator fatigue to assure more production per man-hour . . . lower cost per mold.

These unique advantages make the Osborn Rota-Lift a profitable investment for any jobbing or semi-production foundry. For full details, write *The Osborn Manufacturing Company, 5401 Hamilton Avenue, Cleveland 14, Ohio.*

Specify OSBORN® leader in mechanization for the foundry

MOLDING MACHINES • CORE BLOWERS • SHELL MOLDING MACHINES • BRUSHING MACHINES • INDUSTRIAL BRUSHES

Circle 604 on Page 85



Ferritic malleable iron stress rupture plot. Lines show calculated least squares fit to the experimental data using standard regression analysis

Malleable Iron Resists High Temperature

Tests show that ferritic and pearlitic malleable irons possess exceptional physical and mechanical characteristics at elevated temperatures

By HANS J. HEINE
Technical Director
Malleable Founders' Society
Cleveland

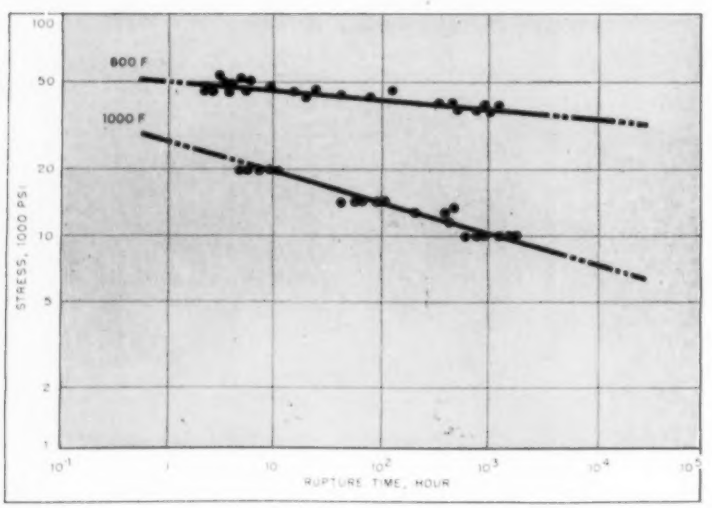
● NEW RESEARCH has conclusively demonstrated that malleable iron has exceptionally good physical and mechanical characteristics at elevated temperatures.

This research, sponsored by the Malleable Founders' Society, has been in progress since April, 1955. Both ferritic and pearlitic malleable were tested for periods up to 2300 hours and at temperatures ranging from 800 to 1200° F.

Results to date indicate a high level of performance by ferritic malleable irons at 800, 1000, and 1200° F. Data for pearlitic malleable indicate excellent performance also. Pearlitic malleables appear equal or superior to unalloyed cast irons with which they are sometimes erroneously compared, and equal or superior in serviceability to a number of alloyed materials.

Greater Use Seen—Because most elevated temperature applications fall within the temperature range which this research shows malleable suited for, it is expected that consumption of malleable iron will increase by a sizable amount for elevated temperature applications. Large numbers of parts for the process, power generating and other industries can be converted to malleable castings with resultant economy, quality, and safety, pending approval by specification-writing bodies.

Especially important to the engineer and ultimately to the consumer is the fact that the stress-rupture curves for malleable irons do not reach a point at which they break sharply downward as do similar curves for other commonly used materials. Instead, they continue at a uniformly slight rate of decline far beyond the breaks in the curves for other metals. To date, high and low carbon ferritic malleable and ASTM grade 60003 pearlitic malleable have been tested. Specimens



Pearlitic malleable iron stress rupture plot. Lines show calculated least squares fit to the experimental data using standard regression analysis

One core oil does it!

Every piece made with Cities Service Delco 58 Core Oil!

Brass Foundry Company in Peoria, Illinois, pours 1,600,000 pounds of brass and aluminum castings per year . . . keeps six core makers constantly busy . . . yet requires only *one* core oil—Cities Service Delco 58.

Unusual under any circumstances, this achievement is all the more significant when you realize that the cores are made for castings that must be extremely precise . . . castings made to the demanding specifications of the automotive, aviation, electrical, and agricultural industries.

Cities Service Delco 58 meets every core oil requirement because, in the words of foreman Arthur King, **"the oil is uniform from batch to batch, gives good workability, and fast-bake, has low gas content and excellent shakeout properties."**

Little can be added to Mr. King's statement except this suggestion: If you're not getting comparable results with *your* core oil, it's time to talk with a Cities Service Core Oil Specialist. Call the nearest office or write: Cities Service Oil Company, 20 North Wacker Drive, Chicago 6, Illinois.

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Top This For Complexity! Few cores can surpass the complex design of this one, held by core room foreman Arthur King. Like all others, it is made with Cities Service Delco 58 Core Oil.

Grandma Never Baked Like This! . . . but Grandma couldn't have taken greater pains than they do at Brass Foundry Company. One great asset is the fast-bake qualities of Cities Service Delco Core Oil.

1,600,000 Pounds Of Brass And Aluminum Castings are poured each year at Brass Foundry Co. They are made to the demanding specifications of the electrical, agricultural, aviation, and auto industries.

Circle 605 on Page 85

Ask Standard

how to cut costs with conveyors

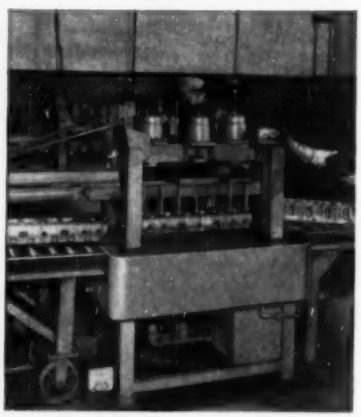
Cylinder blocks are chipped, ground and inspected on Standard Roller Conveyor line.

Eastern foundry simplifies cylinder block handling with roller conveyors

HERE'S another installation in which Standard Roller Conveyors are keeping heavy, bulky components flowing to machining and assembly points with minimum manpower and practically no time loss.

Easy to set up and exceptionally sturdy, Standard Roller Conveyors (live or gravity) can also be job-tailored to your specific materials handling problem — permanent or temporary.

And roller conveyors are only one of the many types of Standard conveyors. Others include belt, slat, chain, pushbar or sectional conveyors as well as spiral chute systems.



Standard Roller Conveyors are available from stock in a wide range of roller diameters, centers and frames.

Call the Standard engineer listed in your classified phone book or write direct for Bulletin 68 — Address Dept. N-8.

Why not take advantage of Standard's half-century of conveyor application experience. Consult STANDARD CONVEYOR COMPANY. General offices: North St. Paul 9, Minnesota. Sales and service in principal cities.

included samples from five different producers of malleable iron. Research is continuing with other grades of pearlitic malleable to obtain authoritative data on all types.

Testing Methods—In this research, test specimens of two grades of standard ferritic malleable (high and low carbon analysis) were obtained from a number of foundries. Several grades of pearlitic malleable also were tested.

Loads were applied to standard stress-rupture specimens by means of weights. Temperatures were measured with a precision standard cell and potentiometer combination. Time to rupture was measured by direct reading clocks capable of indicating 0.1 hour. These were connected through microswitches actuated to stop the clocks when specimens failed. Elongation was measured by means of dial gages calibrated in 0.001 inch.

Results—As a result of these tests, we now know that tensile strength shows very little change with temperature below 700° F.

The data obtained indicate a general high level of stress versus rupture time, equal or superior to other ferritic cast materials for which data are available, particularly at 800° F. The strength of malleable iron at 1000 and 1200° F is adequate for many uses. There is no evidence of abrupt changes in behavior or structure during the test periods, which extended from 1 to over 2000 hours.

Book Review

Vacuum Metallurgy, edited by R. F. Bunshah, cloth, 472 pages, 6 x 9 in., published by Reinhold Publishing Corp., 430 Park Ave., New York 22. Price $12.50.

Contains a series of 27 lectures sponsored by the Department of Metallurgical Engineering, New York University.

Book is divided into ten parts covering specific topics. The first four pertain to vacuum equipment, thermodynamics and kinetics, arcs and arc melting processes, and induction melting processes. Electron bombardment melting techniques, degassing in the liquid and solid states, and distillation of metals are dealt with in the next three parts. Concluding parts discuss metallurgical application of vacuum processing, analytical techniques, and future trends.

Circle 606 on Page 85

With Extras . . . At No Extra Cost

1. METAL PISTON ROD SCRAPER—protects rod packing, cylinder bore and rod surface by removing all foreign particles.
2. NEW "SUPER" CUSHION for air or METALLIC SELF-ALIGNING MASTER CUSHION for oil.
3. HARD CHROME PLATED CYLINDER BORES AND PISTON RODS for greater protection and reduced wear.
4. ONE PIECE PISTON assures better alignment, longer bearing and packing life.
5. FORGED SOLID STEEL HEADS throughout entire line.
6. PILOTED PACKING GLAND with extra long bearing for additional strength and support to piston rod.
7. NO TIE-RODS TO STRETCH—gives you 360° port rotation . . . less space used . . . full strength.
8. STREAMLINED DESIGN . . . operating pressures to 200 PSI, air; 1,000 PSI oil, non-shock.

Specify the

T-J Spacemaker

for longer, more efficient cylinder service

You too—can reduce replacement expenditures—lower maintenance costs with the T-J Spacemaker cylinder line. Designed and engineered for ruggedness, and accuracy of operation, the Spacemaker assures longer, uninterrupted operation.

The T-J Spacemaker eliminates tie-rods, gives greater strength, saves space . . . and reduces costs in all push-pull operations. Immediate delivery in a complete range of styles and capacities . . . air or oil. Write for Bulletin SM 155-4, today. The Tomkins-Johnson Company, Jackson, Michigan.

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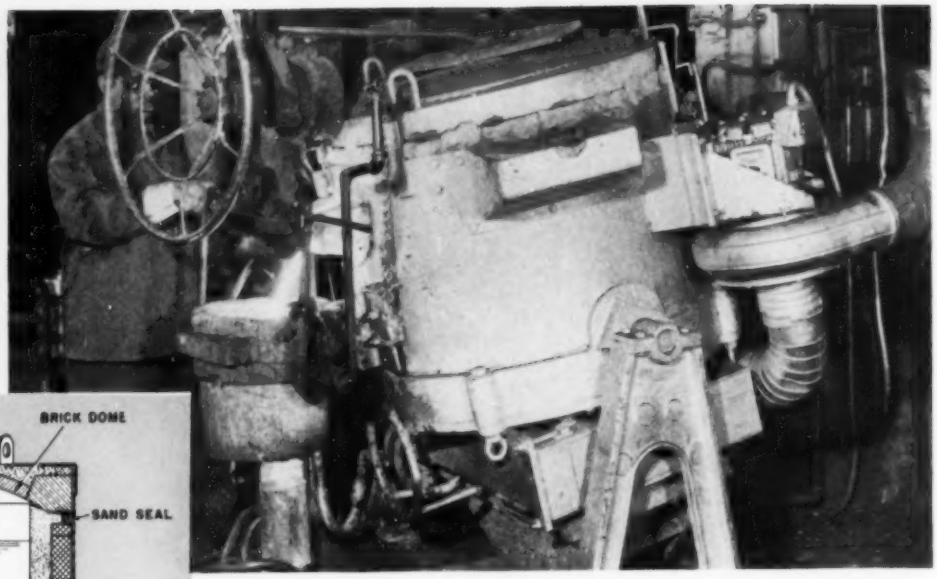
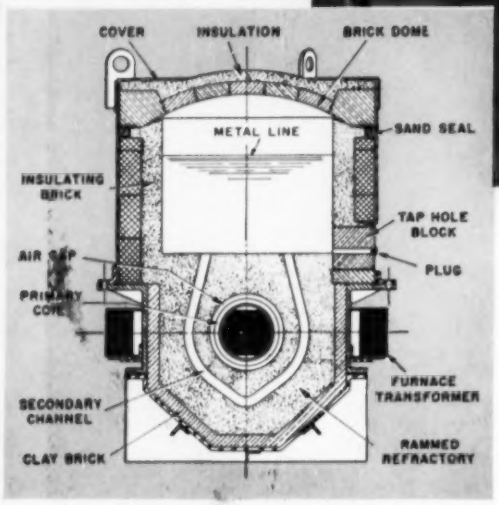
RIVETORS . . . AIR AND HYDRAULIC CYLINDERS . . . CUTTERS . . . CLINCHORS

Circle 607 on Page 85

Power-operated tilting mechanism facilitates frequent tapping of induction furnace



Construction of 60-cycle, 125-kw induction furnace. It is employed to melt gray and ductile irons by a California foundry



Melting Iron

Induction melting of iron solved a casting problem at Dayton Foundry. Installation of more and larger furnaces of the same type is anticipated

By M. B. HARTMAN
Assistant Plant Engineer
Dayton Foundry
Hollydale, Calif.

● AT DAYTON FOUNDRY, Hollydale, Calif., metal for ductile, gray, and alloy cast iron centrifugal castings and for ductile iron sand castings is produced in a 60-cycle, 125-kw induction furnace. The company's experience with this unit has met with such success that it anticipates the installation in its plant of more and larger furnaces of the same type.

Dayton Foundry has produced gray iron castings for 30 years, the last 20 years with the Sorbo-Mat Process. Approximately 70 per cent of the production is class 40 to 50 iron, produced in a 36-in., acid-lined cupola melting 8 to 9 hours per day at a melting rate of 4½ tons per hour.

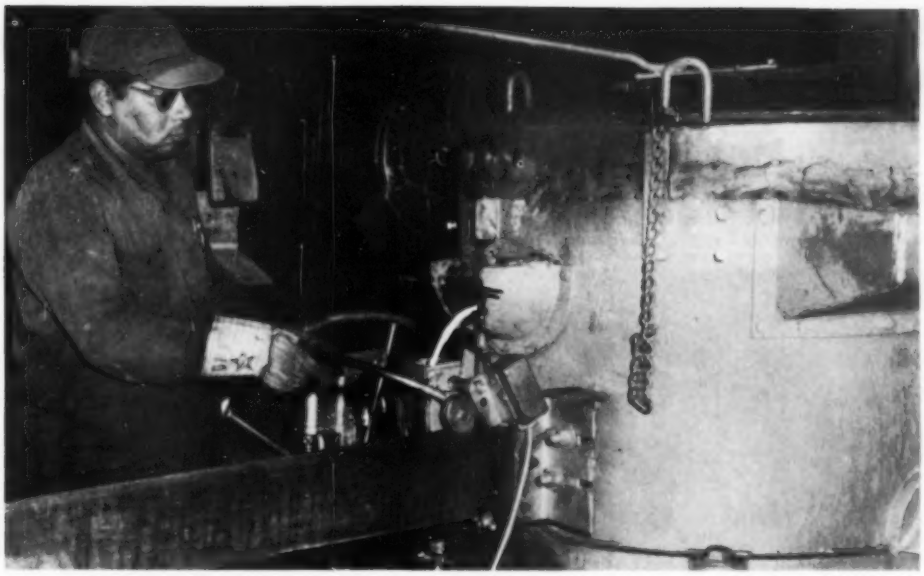
Centrifugal Castings—For many years the company has made large and medium-sized cylinders and cylinder liners. Some time ago, the sales department encountered many demands for centrifugally cast liners and bushings. After a careful market analysis, management decided to enter the centrifugal casting field, on a limited basis at first.

After several months of experimenting, it became obvious that the cupola would not serve as the melting unit for this operation. This development posed the problem of another melting unit, one that would supply 300 to 500 lb of molten metal per hour and permit extremely close control of chemical analysis.

The choice was confined to either a gas or an electric unit. A gas furnace offered low initial cost and low fuel cost, but we decided against it because of our holding requirements. In this operation it is necessary to hold high carbon iron at pouring temperature (about 2600° F) for long periods. We felt that we could not operate a gas furnace in this manner.

Advantages — Various electric melting units were considered, all of them in great detail. The Ajax-Wyatt 60-cycle, tilting-type induction furnace with a 125-kw rating was chosen for these reasons:

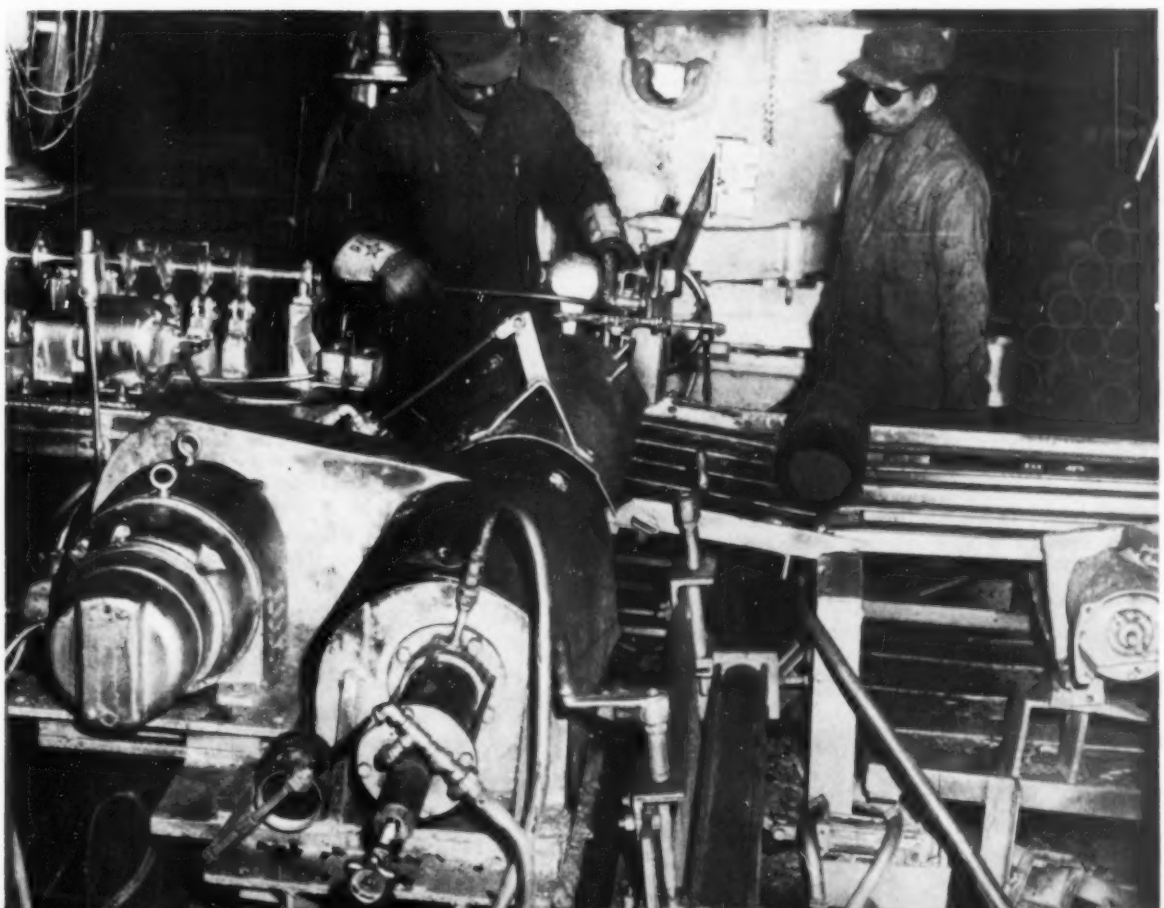
1. Availability in the melting capacity desired.
2. No problem was expected in chemical analysis control over long holding periods.
3. Good delivery.
4. Favorable cost.
5. Although molten metal must be available to start the unit, we have it whenever needed.
6. Practically noiseless operation (important because the plant borders on a residential district).
7. Power requirements which suit



Furnace is tapped into the small ladle, which rides track to centrifugal casting machine. Electrical cable leads attach to a mercury switch which starts spinning of the machine when sufficient metal has been poured

Small ladle of metal poured into centrifugal casting machine, trips mercury switch and starts the casting machine motor

in the Induction Furnace



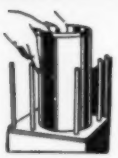
IT'S A FACT:

ALLIS-CHALMERS LIFT TRUCKS SAVE YOU MORE... MAKE YOU MORE!

HERE'S PROOF... **When it comes to sustained high production over the years — ability to stay on the job and out of the shop — Allis-Chalmers trucks have it! As these owners happily admit:**

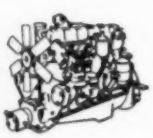
"They're tougher and require less maintenance," says the mechanic at a Wisconsin foundry. "I particularly like the overhead valves and wet cylinder liners — makes our job a lot easier."

Reason: Wet cylinder liners are easily replaced — no need to rebore.



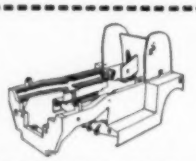
"Maintenance costs are one-third less than with lift trucks previously used" reports a Michigan factory. "We used to replace an engine a year," says the vice-president. Haven't replaced any in our Allis-Chalmers trucks."

Reason: The heavy-duty, industrial engine is the strongest and most rugged used in a fork truck.



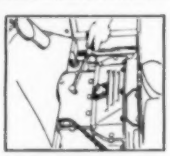
Downtime, None — That's the report of a Florida cement block manufacturer. His 4,000-lb lift truck has operated steadily for more than three years.

Reason: Rugged construction of Allis-Chalmers trucks which is typified by automotive-type frames.



"They're certainly accessible to work on," says the mechanic at a Missouri factory, "— although we have not had too much maintenance and no parts replaced at all so far."

Reason: A good example of accessibility: only 30 minutes is required to change a clutch.



Let your material handling dealer show you additional production and maintenance figures for Allis-Chalmers lift trucks that make their superiority a *fact*. Allis-Chalmers, Milwaukee 1, Wisconsin.

ALLIS-CHALMERS

BH-1058

Plan to stay ahead... MODERNIZE!

the situation of our company.

8. This particular unit can be installed and operated as a primary melter without any air pollution control equipment, provided that clean scrap is used in melting. This point is an important one in Los Angeles County, where air pollution control equipment can cost as much as or more than the melting equipment.

Castings Vary—The weight of our centrifugal castings varies from 6 to 150 lb. When the smaller castings are poured, tapping may be as frequent as every 30 seconds. This need is met easily with a power-operated tilting mechanism. When operated under full-capacity conditions, the power unit is placed on its highest output tap, and the pouring temperature is held constant by a charge of 50 to 100 lb whenever the metal bath begins to overheat. Because the power unit has various output taps, we can balance input to the furnace with pouring rate and maintain a fairly constant pouring temperature.

The charge consists of pig iron, with enough steel to keep carbon at the desired level. When alloys are used, they are added, as needed, per 100 lb of metal charged. The pig iron runs approximately 4 per cent total carbon, and for certain jobs a very high carbon is a great advantage. When straight pig iron is melted, the total carbon approaches 4 per cent very closely. Because there is a slight silicon pickup in the slag, additional silicon must be charged to make up the desired level. This silicon loss is only slight.

No Melting Loss

So far as we have been able to determine, there is no melting loss of any of the metal components. We have taken a careful and complete analysis at the beginning of a shutdown period (a period such as a vacation, long weekend, etc., during which we held the molten metal at about 2300° F) and again at the end of the period and compared results. They show no significant change in chemical analysis.

As previously stated, accurate chemical control is essential to the operation. We take carbon checks every few minutes with a Leco analyzer, and various chemical

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Circle 609 on Page 85

analyses are made in our own laboratory.

Ductile Iron Production—In 1953 we started an experimental program on the production of ductile iron in an acid-lined cupola. It was not successful for these reasons: 1. Interference with daily cupola production of gray iron. 2. Inconsistency of results. 3. Temperature problems after desulfurization and inoculation.

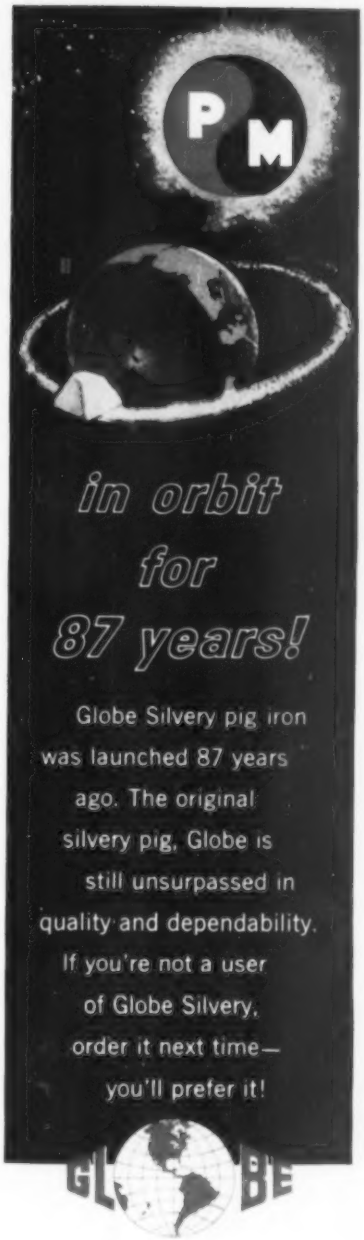
Soon after the induction furnace was in and operating, we saw the potential that it possesses for melting ductile iron. Since this type of furnace permits excellent chemical control, it is ideally suited for ductile iron. We use a low-phosphorous, low-manganese pig iron and, again, add just enough steel to arrive at the desired total carbon level.

We easily could melt scrap iron and steel. We believe, however, that because the improved control permits us to have a single, constant-analysis scrap, we are dollars ahead to buy and melt premium pig iron almost exclusively.

The plant capacity for ductile iron at the present time is limited to small castings—from 6 to 150 lb on the centrifugal unit and to about a 1000-lb pouring weight in sand castings. Total tonnage is limited by furnace capacity.

Change of Analysis—A change of analysis can be accomplished in this furnace in one of two ways, depending on what analysis is in the furnace and what analysis is desired. If we intend to change the iron specification from a gray iron to a ductile iron, for example, we allow the furnace to become nearly empty. The furnace holds a maximum of 1500 lb and a minimum of about 500 lb. We then charge a predetermined amount of a predetermined mixture of pig, steel, silicon, etc., until we have counterbalanced or diluted the effect of the 500 lb of material in the furnace. We then switch to our standard ductile iron mix and continue the charging and pouring procedure.

Only one iron change is difficult—a change from a low-carbon, high-alloy mix gray iron to a soft gray iron. The 500 lb of high alloy mix left in the furnace is not diluted enough by the additional 1000 lb charged. As a result, it is necessary to pig 500 to 1000 lb to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for
87 years!
Globe Silvery pig iron was launched 87 years ago. The original silvery pig, Globe is still unsurpassed in quality and dependability. If you're not a user of Globe Silvery, order it next time— you'll prefer it!
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Circle 610 on Page 85

"Rotoblast Steel Shot cuts abrasive costs in half!"

Rotoblast Steel Shot reduces abrasive consumption more than 50% at Atlantic Steel Castings

"Talk about a rugged cleaning job!" says Mr. William Burrows, Plant Manager, Atlantic Steel Castings Co., Chester, Pa. "Our castings are carbon and low alloy steel, running as big as eight tons each. We used to think we had a good abrasive until we tried Rotoblast Steel Shot. Our tests proved (and we double-checked them to make sure) that Rotoblast cut our shot consumption per wheel hour to less than half. That means our abrasive costs are cut exactly in half! Also we've found that Rotoblast gives us the kind of finish that our customers in the railroad, steamship, steam turbine* and automotive industries demand."

Prove Rotoblast's cost-cutting qualities in *your* plant. To arrange a trial, talk to your Pangborn man or write PANGBORN CORPORATION, 1400 Pangborn Blvd., Hagerstown, Md. *Manufacturers of Blast Cleaning and Dust Control Equipment — Rotoblast Steel Shot and Grit.*

**The toughest castings in industry to clean.*

Pangborn

ROTOBLAST® STEEL SHOT AND GRIT

"wash" the alloy out. For the most part, however, changing specifications and mixtures is as easy in this furnace as in any other—and considerably more accurate than in some.

Maintenance Easy—Maintenance and lining repair should be mentioned. A newly relined furnace was put on the line on Oct. 1, 1957, and taken off on Oct. 1, 1958. During this period approximately 200 tons were melted. Maintenance required on the furnace during the year included these jobs:

1. Two bearing changes on the cooling fan motor (two hours per change).
2. Chipping out metal and slag buildup at the charging opening. This job required about one-half hour every two months.
3. Patching the pouring spout—a 15-minute job every two or three days.
4. One relining of the upper case (this is the area above the heating channel—see diagram—where the metal bath is held).

Time required to reline the upper case was one day—Friday to reline and Saturday and Sunday to dry, with the furnace in operation Monday morning. Cost of this relining in labor and material was $250, with but one day of production lost.

Five months later this furnace was removed. The lining was examined carefully as it was chipped out of the steelcase. We found that the lower case (see diagram) around the heating channel was in practically new condition and that

"But my analyst says I need to work with my hands"

we again should have relined only the upper case. Including material and labor, the complete relining cost was $1000. Our experience to date makes me believe that the lower half of this furnace has a life expectancy of some years when the furnace is operated as this one is.

The upper case fails because of the reaction of slag with the lining. If we could prevent that reaction, or keep the slag from forming, or remove the slag constantly, we could operate an almost maintenance-free furnace for an indefinite period. Everything considered, maintenance of this type of furnace is a minor item.

Cost of Operation—An analysis of the cost of operating a unit like this can best be shown as a comparison with the cost of a familiar standard, such as a cupola.

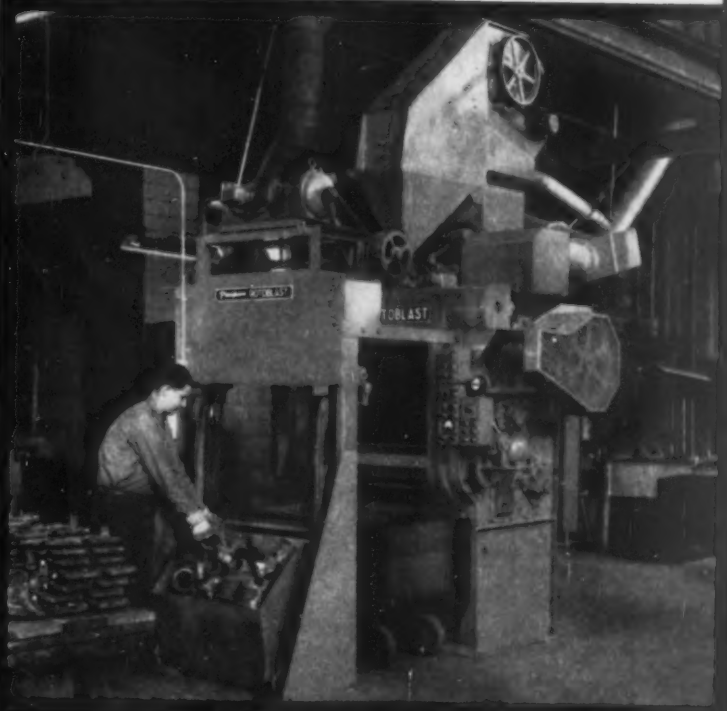
Cost of operating the cupola at Dayton, per pound of metal, breaks down as follows: Fuel, 0.7 cent; raw material (cast scrap, steel scrap, returns, and pig iron), 3.0 cents; labor (charging, melting, and tapping), 0.6 cent; and maintenance, repair, lining material, etc., 0.5 cent. The total is 4.8 cents per pound of metal.

Cost of operating the 60-cycle induction furnace, calculated on the same per-pound-of-metal basis, is as follows: Power (based on two-shift operation), 0.7 cent; raw material (90 per cent premium pig iron), 3.5 cents; labor (charging, melting, and tapping), 0.3 cent; and maintenance, repair, lining material, etc., 0.4 cent. The total is 4.9 cents, or 0.1 cent more per pound than the cost of operating the cupola.

Neither total is actual total cost. Excluded are such items as alloys, overhead, and similar factors which would be common and equal for each unit and would vary in any particular plant.

Two important points in comparing costs should be kept in mind: 1. The vast difference in melting rates of the two units. For a good comparison, we should have an induction furnace of equal melting rate. 2. The fact that we are not operating our induction furnace in the most economical manner. A considerable saving could be obtained if we used cheaper scrap and operated on an around-the-clock basis.

ROTOBLAST CUTS CLEANING TIME 70%!



Pangborn Rotoblast reduces cleaning time from 15 minutes per load to 4½ minutes at Buckeye Iron & Brass

To reduce costs and still keep up production schedules, Buckeye Iron & Brass Works, Dayton, Ohio, replaced its centrifugal blast cleaning barrel (which is still in good operating condition) with an automated 6′ Pangborn Rotoblast Barrel. The result: cleaning time was cut from 15 minutes per load to 4½ minutes!

Through automation, the Rotoblast Barrel has also saved the company the cost of one full-time operator and has proved economical in terms of maintenance. In seven months, no repairs or replacements, other than vanes, have been necessary!

For full details on how Pangborn Rotoblast can save you money, write for Bulletin 1400 to PANGBORN CORPORATION, 1400 Pangborn Blvd., Hagerstown, Md. *Manufacturers of Blast Cleaning and Dust Control Equipment—Rotoblast Steel Shot and Grit.*

Pangborn

CLEANS IT FAST WITH ROTOBLAST®

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Industry Briefs

Electric Steel Foundry Co., Portland, Oreg., has purchased Pacific Alloy Engineering Corp. from Pelton Steel Casting Co., Milwaukee. Pacific Alloy, which is in El Cajon, Calif., will operate as a subsidiary of ESCO. Its name has been changed to Pacific Alloy Corp. Joseph A. Blake has been named president of the subsidiary.

Schauer Bronze and Aluminum Foundry, Cleveland, is planning a new $500,000 foundry at 3120 E. 80th St., Cleveland. The 30,000 sq ft of foundry and office space will be built on a 1½-acre plot in the fall.

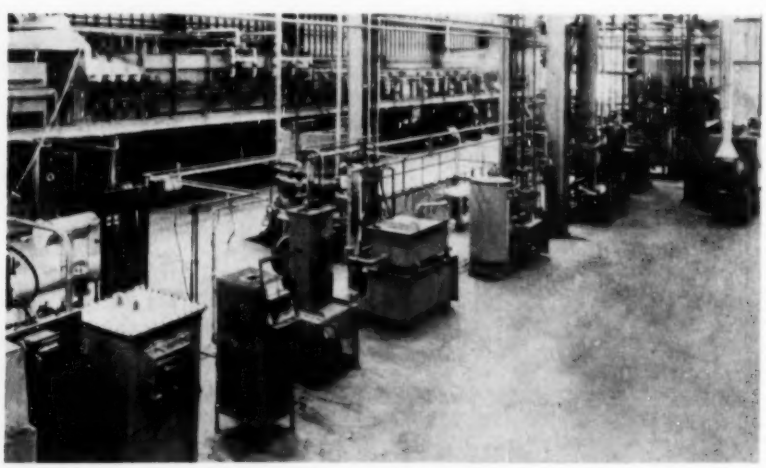
Harvey Aluminum, Torrance, Calif., has opened new sales engineering offices at 530 Silas Deane Highway, Hartford, Conn. District sales manager is Douglas Kaplinger. Telephone number is JAckson 9-5120.

Marietta Concrete Corp., Marietta, Ohio, has merged its business and operations with those of American-Marietta Co., Marietta. Marietta Concrete will be operated as a part of the parent firm's Concrete Products Div., and F. Leonard Christy, president of Marietta Concrete, will continue as chief operating officer.

Crucible Steel Casting Co., division of Consolidated Foundries & Manufacturing Corp., Chicago, has been purchased by Howe Sound Co., Salt Lake City, Utah. Crucible Steel will continue to operate at its present address, 2850 S. 20th St., Milwaukee, Wis. The plant employs about 500 workers. Howe Sound is engaged primarily in the mining and milling of nonferrous metals.

Planet Corp., Lansing, Mich., has appointed G. M. Wallace & Co., Denver, to be its representative in the Rocky Mountain-Intermountain states.

Kaiser Aluminum & Chemical Corp., Oakland, Calif., has put into operation another 22,000 tons of primary aluminum capacity by reactivating a potline at its reduction plant in Mead, Wash. The company now is operating at a total annual level of 524,000 tons, 86 per cent of its total capacity and the highest in its history.



RESEARCH and DEVELOPMENT: Electric Furnace Co., Salem, Ohio, recently completed an 80 x 180-ft building equipped for the study of heat treating techniques. The company engineers, builds to order, and installs gas and oil-fired and electrically-heated furnaces and special atmosphere generators for continuous or batch heat treatment of ferrous, nonferrous, or alloy products

Metallurgical Products Department, General Electric Co., has moved its Cleveland office to 130 Northfield Rd., Bedford, Ohio.

Skoda, a Czechoslovakian industrial firm, has contracted to build a $60 million forge and foundry plant at Ranchi, in east India.

Hewitt-Robins Inc., Stamford, Conn., has established a subsidiary, Hewitt-Robins (Italia) (SpA), in Genoa, Italy. Vincent Castoro will be resident manager.

Whitehead Metals Inc., a subsidiary of International Nickel Co., New York, has opened a 45,000-sq-ft sales office and warehouse in Syracuse Industrial Park, Syracuse, N. Y.

Pabcast Corp., Gardena, Calif., is adding a 10,000-sq-ft steel building to its 30,000-sq-ft plant. The company produces aluminum diecastings and brass sand castings.

Nordon Die Castings Co., Maywood, Ill., will operate in the future as a wholly owned subsidiary of Skil Corp., Chicago.

International Minerals & Chemical Corp., Skokie, Ill., celebrated its 50th anniversary in June. A traveling display of historical pictures and the adoption of a special anniversary emblem are features of the celebration program which will continue throughout the year.

Metal Treating Institute reports billings by its members during May of $3,405,600 or 40.6 per cent more than for May, 1958.

Refractories Div., H. K. Porter Co., Pittsburgh, has begun full production of its first basic refractory specialty, a plastic chrome ore, at its new $12 million plant at Pascagoula, Miss.

U. S. Nuclear Corp., P. O. Box 2002, Burbank, Calif., has been formed to provide alpha, beta, gamma, and neutron sources; industrial tracers; handling and shielding

A REPORT TO FOUNDRIES

FROM TOM BARLOW

New hope for overweight castings . . .
shed pounds like magic

Sometimes it's hard to figure out where you will end up when you start out. We recently found ourselves with two new products when we only meant to develop one. The one we didn't intend to develop seems to be the most exciting.

How would you like a facing sand that costs no more than an average facing for large castings but which would give such close control over casting dimension that you might take as much as 165 pounds off a 1000 pound casting? You don't believe it? We're doing it! Let us tell you the whole story.

We've been playing with the CO_2 process for some time. We finally came up with a product that had the advantage of good green strength before gassing. We filed for patents on the basis that this product would be of real value for boxes that are hard to draw after gassing.

As you know, a gassed CO_2 core requires good drafts, smooth boxes, etc. They don't all come that way. So with this product, you have enough green strength to draw the core and gas outside the box. Blown CO_2 shells and similar applications came to view. We also filed on the discovery that with this binder we could add up to 1.5% Westonite DS Powder to: 1) cut gassing time in half, 2) stop penetration, 3) improve green strength even further, and 4) improve shakeout. All this seems good if not earth-shaking, but the outgrowth of the idea was really startling.

This is news like "man bites dog". With a slight change in product, we found a way to make skin dried molds like you never saw before! The facing is made of sand plus 3.5% to 5% of Acrasize (the reason for the name will be obvious in a minute) plus 0.5% to 1.5% Westonite DS Powder. Mull for 2 minutes in high speed, or 6 minutes in wheel-type muller (mixers can also be used). The stuff comes out feeling like a good steel sand — about 6 to 7 pounds green strength, high toughness and *no* stickiness. It has a bench life of up to 8 hours if covered with a wet sack in a facing bin. This is rammed over the pattern in the usual way. The pattern is drawn. The mold face is then sprayed with an alcohol wash — high in alcohol, low in wash — and touched off.

The mold is like a rock! The casting is "like a shell". We have worked up to nearly 2000 pound castings and don't know the upper limit. Casting weights have been reduced by between 8% and 16% just by elimination of invisible mold wall movement. We will be glad to show you — in your foundry — something you never saw before.

The core binder — yes, we still think it's the best. We call it "Acrasize, low green" to differentiate it from the facing binder. If green strength, penetration or collapsibility are problems in your CO_2 work, maybe we can help you.

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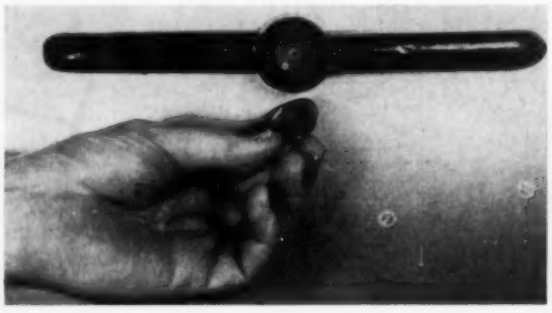
HOW To Do It

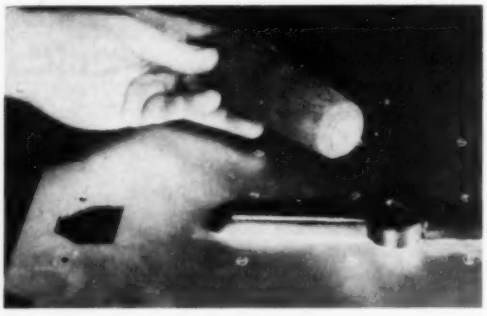
FOUNDRY will pay a minimum of $15 for each "How To Do It" idea submitted and published

Magnet Holds Sprue Former in Place

By H. J. GERBER
Assistant Professor
Metalworking Technology
Oklahoma State University
Stillwater, Okla.

A SMALL Alnico button magnet, permanently installed in the sprue seat of a matchplate, will help hold the sprue former in proper position while the mold is filled with sand. Drill a hole slightly smaller than the outside diameter of the magnet in the center of the sprue seat and drive or press the magnet into the hole. Then attach a washer or steel shoe to the bottom of the sprue former. Contact of the shoe with the magnet will hold the sprue former in place. It can be removed from the completed mold with a slight twisting and pulling motion.





equipment for use with radioactive materials; and compounds for chemical and biochemical use. Consultation, decontamination, training, waste disposal, and health services also are offered.

Schmidt Aluminum Castings Corp., formerly Florida Aluminum Castings, has moved to a new plant at 2880 46th Ave. N., St. Petersburg, Fla., with almost three times the floor space previously available. Productive capacity will be increased by more than 600 per cent.

H. K. Porter Co., Pittsburgh, has sold the land and three factories of the Laclede Works of its Refractories Div., St. Louis, to interests taking title in the name of Ann S. Dattilo. Porter will operate one of the factories with no change in present employment under a five-year lease agreement.

Wells Bronze and Aluminum Foundry Inc., Worcester, Mass., has been elected to membership in the Non-Ferrous Founders' Society, national trade and management organization of the nonferrous castings industry. Roger H. Marble, president and treasurer of the foundry, is the official society representative of his firm.

Indiana Steel Products Co., Valparaiso, Ind., and General Ceramics Corp., Keasbey, N. J., have agreed on terms for a merger. It would involve the issuance of shares of Indiana Steel in exchange for all the outstanding shares of General Ceramics, subject to approval of stockholders of both companies.

Allis-Chalmers Mfg. Co., Milwaukee, Wis., has acquired the Tractomotive Corp., Deerfield, Ill. It is the 21st plant in the Allis-Chalmers family and will be operated as the Deerfield Works.

Petrocarb Inc., New York, has acquired Metallurgical Div., American Briquet Co., Philadelphia, which it will operate as its Industrial Materials Div. The new division will continue the manufacture and sale of injection equipment and the sale of solid reagent materials to the metallurgical industry. Petrocarb is a subsidiary of Godfrey L. Cabot Inc., Boston.

North American Refractories Co., Cleveland, has expanded its Cleveland warehouse facilities 80 per cent by leasing new warehouse space at 47th Place and Holyoke Avenue, Cleveland.

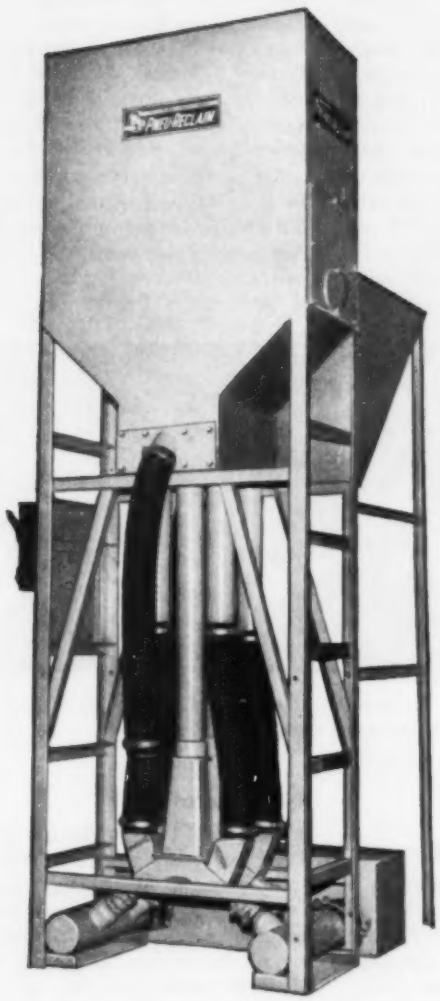
AFS Organizes International Foundry Congress Tours

American Foundrymen's Society is organizing two official tours to the International Foundry Congress, to be held in Madrid, Spain, Oct. 4-10, 1959. Thos. Cook & Son have been declared the Official Travel Agents for them.

Tour No. 1 travels both ways by steamship, with 37 days in Europe. Tour No. 2 travels both ways by air with 31 days in Europe. The itinerary of each tour varies considerably.

Official AFS delegates to the Congress will be Director Clyde Sanders and Technical Director Sil Massari.

IS YOUR FOUNDRY DUMPING OVER $12,000 IN RECLAIMABLE SAND THIS YEAR?



EVEN SMALLER FOUNDRIES DO...

Large expenditures for new sand aren't limited to the larger foundries. Many foundrymen are surprised and even shocked when they calculate the cost of new sand in their foundry operations. One typical medium-size foundry revealed these figures:

Cost of new sand per ton at siding	$5.83
Cost of moving sand to storage, per ton	.65
Cost of storage, per ton	.25
Cost of trucking used sand to dump, per ton	.55
Total cost, per ton	$7.28
Total cost per month (based on 150 tons/month)	$1,092.00

Of course, bigger foundries spend more . . . much more. Yet, the sand hauled to the dump is perfectly reclaimable for use as new sand. The sand dumped represents dollars lost forever . . . dollars that a reclamation unit could save.

NOW—RECLAMATION COSTS LESS

The newest of dry reclamation units—Pneu-Reclaim—actually costs less to install and use than earlier units. Its many exclusive features—dual-jet scrubbing, high recovery fines control, level-flow and simple quantity-quality control—mean lower-cost operation and superior peformance. The typical costs shown below are based on hundreds of actual tests:

Typical cost of reclaiming for reuse in molding sand mixtures, per ton	30c
Typical cost of reclaiming for reuse in core sand mixtures, per ton	90c
Typical cost of reclaiming for reuse in CO_2 sand mixtures, per ton	60c

These costs include all of the charges for power, maintenance and operation. Because Pneu-Reclaim *requires half the air pressure for operation, it consumes half the power required by earlier units.*

AND SAVES MORE!

It's easy to find how much Pneu-Reclaim can save your foundry. Simply compute the actual cost of each ton of sand delivered to your foundry, used in your system and then discarded, and subtract the cost of reclamation. The difference represents the saving offered by Pneu-Reclaim per ton of sand reclaimed and used in lieu of new sand.

TYPICAL EXAMPLE

Cost per ton of sand delivered, used and discarded	$7.28
Cost per ton of sand reclaimed for reuse in molding sand mixtures	.30
Saving per ton	$6.98
Saving per month (based on 150 tons/month)	$1,047.00

A no-obligation demonstration will prove these facts for you. Write today!

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Div. Pettibone Mulliken Corp.
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Foundry Developments

New Aluminum Alloy

THROUGH variation of the chemical composition of the conventional A-356 aluminum alloy, Rolle Mfg. Co., Lansdale, Pa., reports development of an essentially new material, highly responsive to heat treatment. Called MA-356, the alloy is said to promise new weight saving efficiencies in sand and permanent mold castings for missiles and high performance jet aircraft.

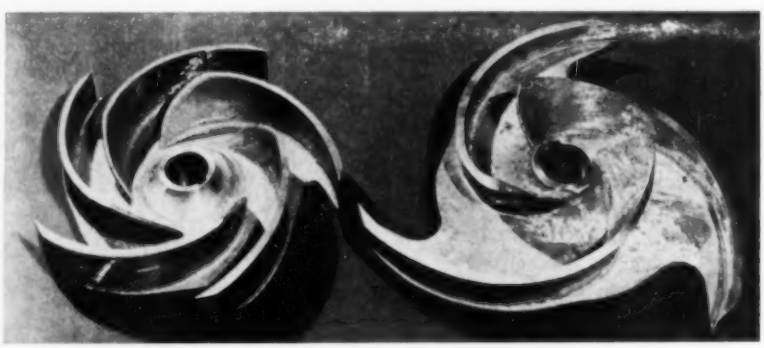
Missile castings now being poured by the firm in the new alloy are said to exceed regularly the physicals specified in MIL-C-21180A. In the T-6 condition the ultimate tensile strength is reported to be controlled within 40,000 to 50,000 psi, the yield strength within 30,000 to 40,000 psi, and elongation within 2 to 5 per cent. With favorable casting configurations, higher physicals are said to have been achieved.

Effect of Alloys

INVESTIGATION of "Property Relationships of Some Cast and Forged Chromium-Manganese-Nickel Nitrogen Steels Containing 18 Per Cent Chromium" by Haefner, Lahr, Meinhart, and Kanter as reported at the recent ASTM annual meeting indicated that austenitic compositional ranges permitting the casting of gas-free ingots were found to be a function of a proper balance of manganese, nickel and nitrogen. Nickel exhibited a marked influence on corrosion resistance, manganese little influence, and nitrogen a dual behavior. Nitrogen strengthened the steels and lowered their ductility slightly. Manganese had little influence, and nickel showed two different effects on mechanical properties when alloyed into nitrogen-free and nitrogen-containing compositions. Pronounced embrittlement occurred in low nickel-containing compositions in the 1000 to 1600° F temperature range. No embrittlement was detected in 1000 hr at 800° F in steels containing up to 15 per cent ferrite.

Resist Alkali Attack

CAST stainless steel impellers subjected to severe corrosion and erosion have operated efficiently for 9 years in chemical pulp processing at the Mead Corp., Kingsport Division, Kingsport, Tenn. Shown in the accompanying illustration, the impellers are made of alloy CF-8M containing 19 per cent Cr, 10 per cent Ni, 2.0 to 3.0 per cent Mo, and 0.08 per cent max. C, and handle strongly alkaline solutions at high rates of flow. According to the Alloy Casting Institute, alloy CF-8M possesses high strength in addition to its corrosion resisting properties.



Fluidity Considerations

CONCLUDING comments in a brief review on "Fluidity of Molten Iron" by E. R. Evans in the *Bulletin and Foundry Abstracts* of the British Cast Iron Research Association, May 1959, follow:

"The only factors affecting the fluidity of molten cast iron are composition and pouring temperature. Thus, for a casting and running system of fixed design, if short-runs are occurring the remedy lies in altering the composition or increasing the pouring temperature. In most foundries it is unlikely that the composition will vary much provided there is reasonable control, and when short-runs occur the probable cause is low temperature. Under these circumstances the measurement of temperature as a control feature in the foundry could be more important than the measurement of fluidity by means of a spiral fluidity test with its accompanying inconvenience of making a mold, casting, knocking-out, and measuring.

"If the foundry is not in a position to alter the composition or increase the pouring temperature when short-run castings are produced, then the best way of correcting the situation is to redesign the runner systems to enable the metal to fill the castings more quickly."

New Metallics

RESEARCH sponsored by the Lead Industries Association at Battelle Memorial Institute indicates the feasibility of making a new class of metallic materials. They are formed by mixing molten lead with finely divided solid particles of other materials, resulting in a material combining properties of both lead and the second substance. Mixing of the molten lead with the powdered solids is accomplished by using a revolving crucible resembling a cement mixer. After mixing, the material is poured into molds which are vibrated to minimize porosity.

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parting is not such sweet sorrow

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liquid parting, that is!

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- Smith L-O "45" Liquid Parting is a low-cost, time-proved formulation providing a smooth, uniform coating that permits molding sand to slip free from the pattern.

- One application of this advanced product will give perfect results up to 40 molds . . . efficiency thus can be increased over conventional dry parting where pattern dusting must be done prior to each mold.

- Smith L-O "45" is ideal for sand-slinger operations as the hot sands do not remove the film produced by the Liquid Parting. Surfaces are completely sealed against absorption of moisture and faster, cleaner operations result. Because of greatest economy and efficiency, you can't afford to operate without Smith L-O "45" Liquid Parting. Place your order today.

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By JACK C. MISKE
Associate Editor

Sectional Meetings Featured at

PENN STATE CONFERENCE

● A VARIED program with sectional meetings devoted to gray iron, steel, nonferrous, and sand topics attracted more than 225 persons to the second biennial Penn State Foundry Conference, held June 25-27 at Pennsylvania State University, University Park, Pa.

The conference opened with a luncheon where Dr. Eric A. Walker, president of Penn State, discussed adult education activities of the school, a category which includes the foundry meeting. Dr. Walker pointed out the need to bring individual skills in balance with skills needed by the American economy. Adult education is one way of achieving that objective.

Other conference activities, in addition to technical sessions, included a picnic at Penn's Cave, at which many foundrymen took the boat trip through the cavern, and the conference banquet.

Speaking at the dinner, Frank G. Steinebach, editor of FOUNDRY, emphasized the importance of castings to our civilization. Everything we have and everything we use depends on castings as components in the final product or in machines used in the manufacturing process. He compared yearly production and value of the product with those of the rolled steel industry and predicted that 1959 casting shipments may reach 17 million tons.

The speaker emphasized the importance of the Foundry Educational Foundation in creating a pool of engineers with training in foundry science and in telling the greatest number of undergraduate engineers of the potentials of castings. He stated, however, that greater support is needed from the foundry and allied industries.

H. C. Erskine, Aluminum Co. of America, left, and T. E. Eagan, Cooper-Bessemer Corp., were program co-chairmen for the conference

GRAY IRON

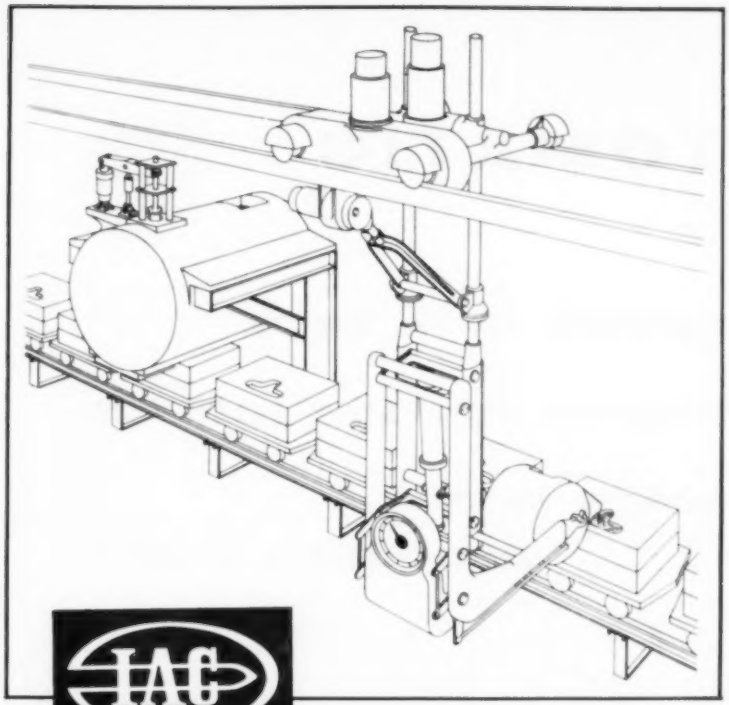
Some Factors for More Profitable Foundry Operation, by M. J. Kellner, Trafford Foundry, Westinghouse Electric Corp.—One of the most effective steps toward more profitable operation is the reduction of indirect expenses. A program of this sort requires continuous effort if the results are to be lasting. An efficient work force is vital to efficient operation, and creation of it demands the recruitment and retention of well trained, high-quality workmen. In this connection, good working conditions help to cut labor turnover, which is expensive.

Cupola Refractories, by T. E. Barlow, Eastern Clay Products Dept., International Minerals & Chemical Corp.—Gun patching of cupola has become common practice, but if the basic concepts of good air-placement are ignored, it is possible to lose many of the advantages inherent to the process. The cupola operator can do a great deal by controlling the cupola, the charge materials, the air-placement equipment, and the refractory to minimize refractory losses per ton of iron melted.

Monolithic patches are subject to all of the usual considerations which affect the life of refractories used in cupola operation. The exact influence of a given factor will be different for the monolithic patch from what it is for a prefired refractory material, but the basic relationship between cupola practice and refractory life exists.

Economical Founding of Ductile Iron Castings, by C. William Gilchrist, Cooper-Bessemer Corp.—The company has been able to realize substantial savings by producing ductile iron castings without risers. Careful process control has made this success possible.

These factors are important: 1. To minimize metal shrinkage, metal composition is adjusted to take maximum advantage of graphite precipitation. 2. Feed-metal requirements are kept to a minimum by use of molds of maximum rigidity, rammed firmly in suitable sand within strong boxes, with



this fully automated pouring device

- Saves manpower and metal
- Improves casting yield
- Reduces scrap losses
- Assures perfect pouring rate control
- Eliminates the "human element"

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★ cycles in 8 secs

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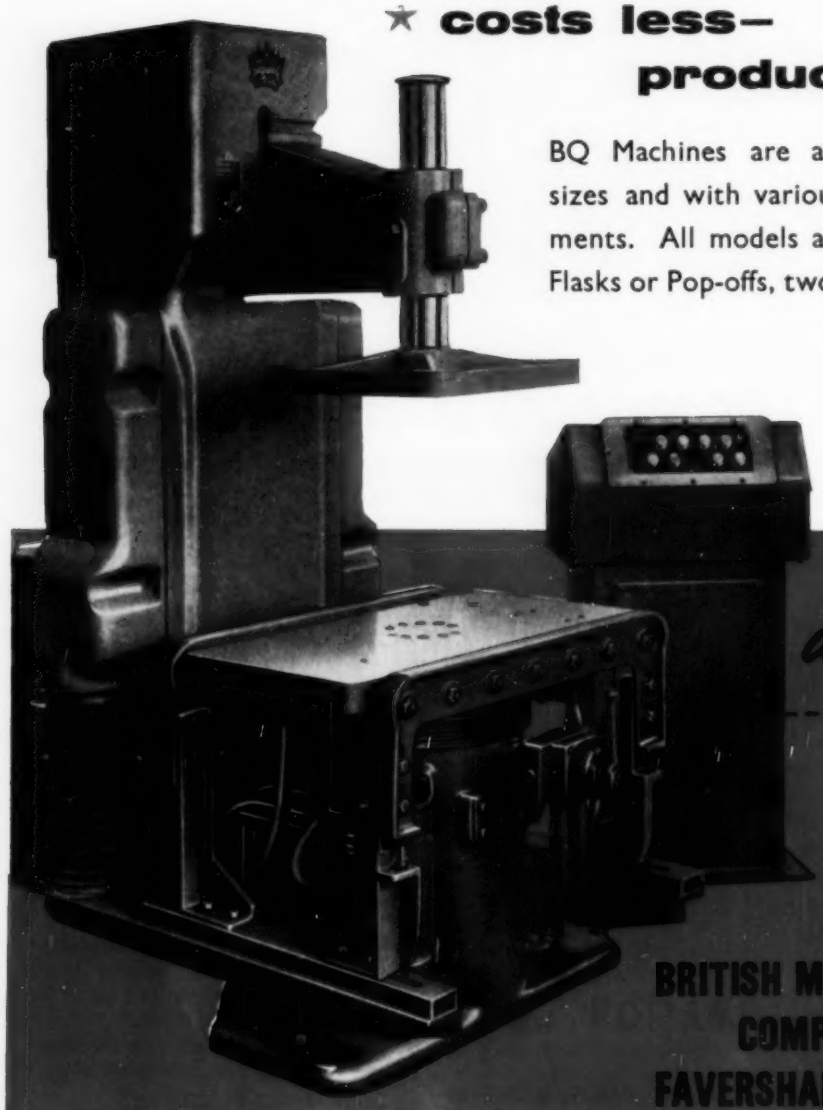

write today

for full particulars of these and other models

BRITISH MOULDING MACHINE COMPANY LIMITED
FAVERSHAM KENT ENGLAND

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elimination of mold wall distortion. 3. When gating is into thin sections, molds are poured rapidly to minimize temperature gradients.

Gating of Gray Iron Castings, by John F. Wallace, Case Institute of Technology — Establishment of a gating system for a gray iron casting requires the following specific steps: I. Selection of an optimum pouring rate or time. II. Design of a gating system which will provide the selected pouring time and comply as closely as practicable with these points:

1. Fill the mold rapidly, without laps or requiring excessively high pouring temperature. 2. Reduce or prevent agitation and the formation of dross in the mold. 3. Prevent slag, scum, dross, and eroded sand from entering the casting by way of the gating system. 4. Prevent aspiration of air or mold gases into the metal stream. 5. Avoid erosion of the mold and cores. 6. Aid in obtaining suitable thermal gradients to attain directional solidification and minimize distortion in the casting. 7. Obtain a maximum casting yield and minimum grinding costs. 8. Provide for ease of pouring, using available ladle and crane equipment.

Ferroalloys and Cupola Melting, by Ralph A. Clark, Union Carbide Metals Co., division of Union Carbide Corp.—Ferroalloys are considered to be any material used primarily to introduce an element other than iron. The major use of alloys is as sources of silicon and manganese. Relative economy of a cupola mixture is influenced greatly by the interplay between the market price of scrap iron and the concentration of the addition agent with highly concentrated sources of an element most economical at times when the price of scrap is low. Materials of lower concentrations have the advantage when scrap prices are high.

Future use of alloys may be expanded by these developments in cupola practice: 1. The unlined, water-cooled cupola. 2. Carbon injection. 3. Ladle silicon. 4. Increased use of inoculation of cast iron.

MALLEABLE IRON

Oxygen in the Malleable Foundry, by John B. LaPota, Cardox Div. of Chemetron Corp.—In furnaces

which burn pulverized coal as fuel, oxygen-enriched air makes more oxygen available for combustion. As a result, fuel consumption is reduced, melting rate is increased, operation is speeded up, and shorter heat time may reduce the amount of oxidation of readily oxidizable elements in the bath. In duplexing operations, oxygen can be used to re-establish good operating conditions after a shutdown or delay. In addition, oxygen can be used for control of chemistry in cupola-air furnace duplexing operations.

Elevated Temperature Properties of Malleable Iron, by Lauriston C. Marshall, Link-Belt Co., (presented by Donald A. Pearson, Link-Belt)—For details on this paper, see Page 94.

Pearlitic Malleable Iron as an Engineering Material, by Carl F. Joseph, Central Foundry Div., General Motors Corp. (presented by Arthur Karpicke, Central Foundry Div.)—Pearlitic malleable iron is a versatile material. Its mechanical properties cover a wide range of applications in all branches of engineering and manufacturing. The tremendous growth in the use of pearlitic malleable iron during the last 20 years is an indication of its acceptance by industry as a reliable and satisfactory engineering material. Numerous substitutions from steel forgings, stampings, and weldments have been made and constantly are being made, as a considerable saving per part.

Many foundries will produce castings for the most critical engineering applications, and new means of control such as the use of electronic and radioactive materials will be used more widely. They are in use already at Central Foundry Div. The day is coming when the casting consumer will demand and get a casting which is practically flawless.

Malleable Gating and Design, by Richard E. Rosien, Eastern Malleable Iron Co. — Gating practice varies greatly from one foundry to another, indicating that it is only one link in the chain of foundry practices required to produce good castings. "Borderline" gating is one practice to avoid universally; it is necessary to allow for variations. Skimmer cores help production of castings by choking, and gates should be designed to hold back slag and inclusions. Feeding aids include use of proper risers, countersinks on top of risers, dead risers to help directional solidification, getting iron entry away from heavy sections, and effective use of chills.

Too many foundries accept poor casting designs to get jobs. It's a wiser course to work for a good design which will give a better product at a lower cost, thus helping both the foundry and its customer. Good design requires knowledge of use of the part and of the strength factor required. The production method should be worked out step by step. Castings should be normally machinable.

NONFERROUS

Looking Ahead at the Nonferrous Foundry Industry, by A. R. Barbour, Roessing Bronze Co.—Production of copper-base castings is falling at the same time that the population is rising. On the other hand, that of aluminum castings is increasing, mainly because of promotion by the primary aluminum producers. Bronze casting fluctuations show deeper valleys and lower peaks since World War II, indicating a continuing declining trend. The copper-base alloys seem to be losing many applications to other metals and to plastics.

Brass and bronze founders must find new markets or continue to lose production, and primary copper producers must promote copper alloys as the primary aluminum producers have promoted aluminum. One disadvantage of brass and bronze producers has been the constant fluctuation of alloy prices, caused by the basic copper producers. The metal requires stable prices, new markets, technical advances, and good selling.

Preventing Casting Defects, by Ray Cochran, R. Lavin & Sons Inc.

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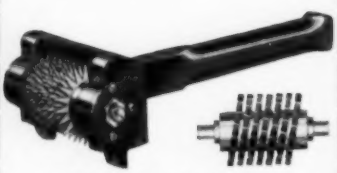
Desmond Hex Dresser

LIVES FOR FOUNDRY GRINDING WHEEL



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DRESSERS

Cut grinding and snagging costs with inexpensive Desmond Hex dressers. They bring grinding wheel faces to "new" efficiency by removing loaded metal and exposing sharp abrasive grains. And Hex dressers provide six sets of bearings in one set of bearing blocks . . . for extra life on average wheels. For resinoid and rubber bonded high-speed wheels use the ball-bearing Desmond Heavy Duty Dresser. Ask your Desmond distributor's advice.

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Circle 619 on Page 85

—Melt quality, gating, feeding, and temperature are vital to production of sound, high-quality castings. High melt quality requires low gas content, freedom from undesirable elements, and no loss of elements originally present. These goals require the following: Clean, dry material; moisture - free furnace, ladle linings, and tools; shortest possible charging and melting cycle; oxidizing atmosphere throughout the melting cycle; and use of minimum operating temperatures consistent with other phases of the casting operation.

An ideal gating system should accomplish these functions: 1. Permit mold to fill at optimum rate, without excessive turbulence. 2. Prevent taking in of air or gas. 3. Minimize erosion of mold or core surfaces. 4. Trap dross or slag. 5. Promote directional feeding. 6. Provide maximum yield and minimum cleaning.

General principles of feeding include the following: 1. Riser location determined by directional solidification pattern. 2. Risers filled with last metal to enter system. 3. Risers remain liquid until sections they feed have solidified. 4. Use of insulators, exothermics, chills, or hot-topping in conjunction with "cold risers." 5. Taking advantage of gravity, hydrostatic pressure, and atmospheric pressure. 6. Use of round risers.

Every casting has an optimum pouring temperature which should be deviated from as little as possible.

Which Core Process in the Nonferrous Foundry?, by Charles E. Coulter, Federal Foundry Supply Div., Archer-Daniels-Midland Co.—Each type of core process has its place in the nonferrous foundry, and all are being used. A brass foundry, for example, uses oil-sand and phenolic resin (shell) cores, athough it would like to produce all its castings with shell cores.

An aluminum foundry employs shell, conventional urea resin, and oil-sand cores. In addition, it has experimented with certain modified ureas and modified corn sugar binders and uses CO_2-hardened cores on short-run jobs with large cores. This firm fits the process to the job.

A leading magnesium foundry

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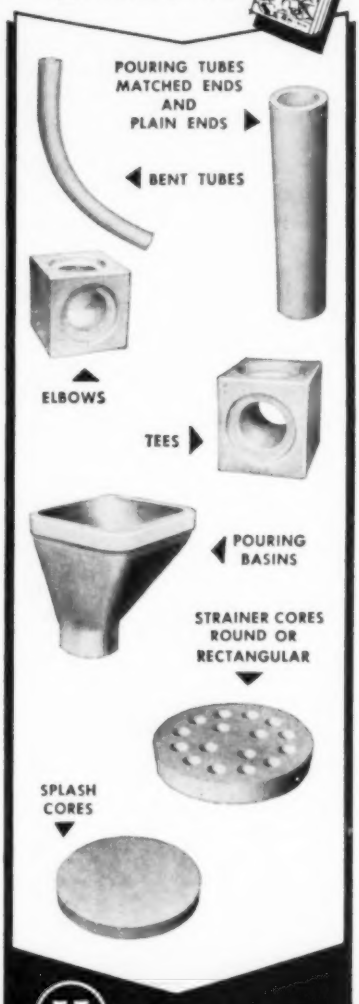

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Circle 620 on Page 85

uses oil-sand, baked urea, and CO_2-hardened cores. It also is looking at possible conversion to shell cores. The air-setting binders are growing in popularity, but chiefly for large cores and for facings in molds for steel and gray iron. Work is progressing rapidly on room temperature air-setting binders and on certain chemical-curing binders.

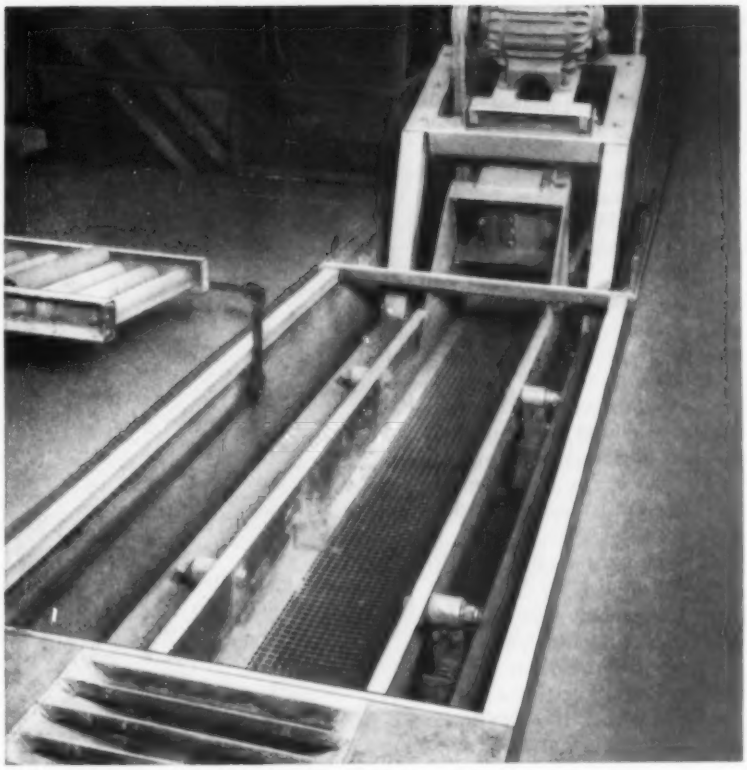
Engineering and the Future of Castings, by E. Belkin, Westinghouse Electric Corp.—Casting processes offer the designer many advantages in the production of complex metal shapes combined with attractive mechanical and physical properties. Unfortunately, castings sometimes are not considered because of a feeling that they might be inferior in quality to parts made by other metal-forming processes.

Continual improvement of the quality level of castings is needed if the foundry industry is to retain and enlarge its share of the market. Designers are increasing the severity of operating conditions to which castings are exposed. The idea that casting is a means of producing cheap but inferior products must be eliminated.

Product Performance and the Designer-Foundry Team, by J. Howard Dunn, Development Div., Aluminum Co. of America—A checklist used by designers in the design of cast components could be used by the foundry to indicate those items which would be influenced by foundry performance. Alcoa renders many services in the way of application specialists, design service, and testing facilities as methods of obtaining business. An integrated company making more than one product has more opportunity for promoting such services. It can examine several methods by which a part can be made and recommend the most economical one.

STEEL

Occurrence, Production, and Uses of Quality Silica, by L. G. Burwinkel Jr., Pennsylvania Glass Sand Corp.—The source of industrial silica products is formations of quality quartzite. Quartzite rocks are processed into numerous grades of silica ranging from 8-mesh sand to silica flour finer than 325 mesh. After reduction to its original quartz grains, the silica is washed three



Photograph shows Ajax Lo-Veyor installed below floor. Floor grids similar to those shown in foreground have been removed to show arrangement of conveyor pan with screen.

AJAX Vibrating Conveyors
Cut Screening and Handling Costs
in Large and Small Foundries

With today's skyrocketing costs, the importance of reducing non-productive expense was never more urgent. Large and small foundries are saving money by conveying sand with Ajax Lo-Veyors.

Photograph shows part of a complete Ajax Lo-Veyor installation in a bronze foundry. Molds are dumped on floor grids at the end of each of ten pouring lines. Large lumps, core butts, and refuse are screened from the sand while being conveyed to the reconditioning system.

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times, accurately screened into uniform grades, and vacuum cleaned. The result is pure white, perfectly uniform grades of quality silica sand (99 per cent SiO_2).

Silica sand and flour have many uses in industry in general as well as in the foundry industry — so many that quality silica probably has more diversified uses than any other nonmetallic mineral.

Sand Segregation, by W. D. Chadwick, Manley Sand Co.—Color film produced by the speaker's company and American Foundrymen's Society showed the behavior of colored dry sand under various applications of storage or bin charging and discharging. The film was followed by discussions of particular experiments.

Cold-Curing Type Binders, by Frank H. Dettore, G. E. Smith Inc. —Experience to date with cold-cure type binders indicates that there will be no limitation on casting weights or metal sections. It is felt that any binder having the inherent properties to produce high tensiles and dense cores will give the results the foundryman expects.

It is the other features of these binders, such as their physical properties, workability, and application, that are of concern, but a material has been developed that will work. Cold-curing binders are in their infancy, but a finished product will soon be ready.

Economic Use of Moldable Exothermic Materials, by John E. Gotheridge, Foundry Services Inc.—Moldable exothermic materials have a definite place in the steel foundry as an aid to production of "better" castings at "lower" cost, provided that they are used in a sensible manner. On a 100-lb casting, moldable exothermic materials will prove to be the cheapest way of making the casting, unless the normal yield is greater than 49 per cent with a melting cost of 2 cents per pound or 60 per cent with a melting cost of 4 cents per pound.

On a 2000-lb casting, moldable exothermic materials will prove to be economical, unless the normal yield is greater than 63 per cent at 2 cents per pound melting cost or 72 per cent with 4 cents per pound melting cost.

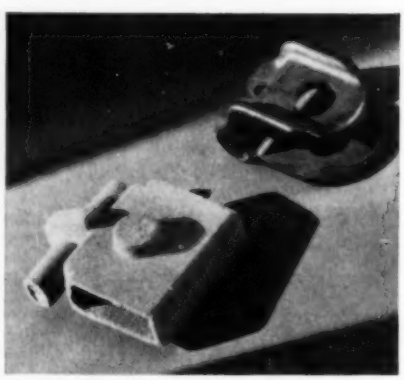
Utility of Sand Binder 230 in Steel Foundry Molding Sand, by

See an opportunity shaping up in this shell core?

Are you passing up jobs you *could* handle —if you had the shell-coring facilities?

This coupler for a farm tractor is an example of just such a job. It couldn't be cast by conventional methods. Tolerances were too tight. As first designed, it had to be *welded* together—involving four separate pieces and seven costly operations.

Now the people at Northern Malleable Iron Company, St. Paul, Minn., are producing it as a one-piece casting—a casting that looks better and *costs roughly 25% less* than the original welded assembly. Its secret: a design change and two shell cores bonded with Durez resins. One core is shown at right.



ANOTHER PART redesigned for shell process at Northern Malleable. The former design employed two cores one of which required core dryers.

These resin-bonded cores preserve the sharp detail of the design. They provide a smooth interior surface on the metal. They allow the foundry to hold dimensions accurately. Tolerances on critical sections are well within the customer's requirements.

The profitable "why" of shell cores

When you make shell cores, you get the speed and accuracy of shell molding, plus these special advantages:

1. You eliminate the need for core dryers, and consequent warpage. Heat transfer from the core box into the sand-resin mix is uniform over the entire core surface.
2. You buy less sand, handle less sand. Cores are lighter, easier to handle.
3. You get better castings, because less gas is produced; gas escapes easily; core holds the metal until it contracts, then core collapses to allow stress-free metal cooling.

SHELL CORES at Northern Malleable foundry are bonded with *Durez 18115 Resin Solution* teamed with *Durez 18117 Accelerator*. This combination gives the right amount of hexa and wax for greatest tensile strength, best possible curing characteristics, and rapid drying when cold-coating sand.

What to do about it

There's a complete family of Durez foundry resins to help you get these results consistently. Your Durez technical man can recommend the resins best suited to your foundry methods. He draws on 38 years of resin experience, plus extensive foundry training, to bring you the answers you need when you need them. For competent help on shell molding and coring, call him in now.

HERE'S THE LASTEST on shell molding and coring—authoritative up-to-the-minute data on patterns, materials, mixing, temperatures, lubricants, molds, cores. It's the new 36-page "Durez Guide to Shell Molding." Write for your free copy today.

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J. L. Dewey and T. J. West, Western Div., Dow Chemical Co. (presented by Mr. Dewey) — Sand Binder 230 is a high molecular weight, water - soluble polymer which is an effective conditioner at treatment levels of 1 to 16 oz per ton. It is not a magic cure-all for sand problems, nor does it replace good sand control.

Further research with the material should extend its utility in the foundry industry. It can be used to advantage in most core formulations, but this application has not been fully investigated at present. Some work also has been done in gray iron foundries with interesting results.

Ferroalloys — Production, Uses, and Trends, by E. R. Saunders, Union Carbide Metals Co. division of Union Carbide Corp.—Growth of ferroalloy usage by a factor of 5 to 1 in the last 45 years reflects both an increase in total steel production and a pronounced trend toward adding more highly complex compositions to casting lines.

Steel foundrymen currently use about 75 lb of alloys per ton of shipped castings. The ferroalloy industry today provides these alloys in the form of more than 100 types of products containing 15 key elements. The industry invariably starts with ores containing desired elements as metallic oxides. It reduces these oxides to the corresponding metallic elements and separates high-purity metals and alloys from the residual gangue and reaction side products.

The future of ferroalloys depends on continual, close co-operation between producers and consumers to insure production of the proper materials for the job.

Deoxidation Practice in Steel Foundries, by John N. Ludwig Jr., International Nickel Co.—Proper deoxidation procedures are important in relation to the production of salable castings, made on a profitable basis, to meet their requirements in engineering service. Adequate oxidation for hydrogen reduction in the metal bath is necessary, with carbon deoxidation, initially applied, to minimize levels of nonmetallic products of deoxidation.

Because of the individual characteristics in performance of silicon, manganese, aluminum, and calci-

Circle 622 on Page 85

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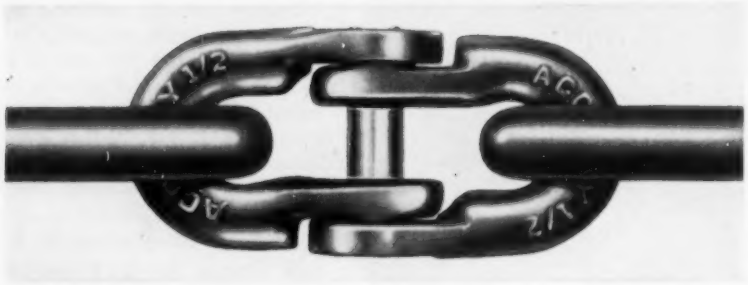

The fast, easy way to make your own endless sling chains

How many times have you wished you had a really practical way of assembling chain into endless slings for use in rolling castings while they're being ground, chipped or inspected? Well, you have it now—with the new ACCOLOY Body Chain Repair Link!

These links exceed the minimum breaking requirements of alloy chain. (ACCOLOY means Acco alloy.) For this reason, you are always safe using ACCOLOY Body Chain Repair Links with alloy or carbon steel chain—in short, any chain of a size equal to its own. They're more flexible than chain, too! The link body of this repair link actually bears the load. Tubular spacer acts as a stud, while the drive pin secures the assembly.

Simple in construction and trim in shape, these links can be assembled (or disassembled) in minutes with nothing more than a hammer. Here's all you do:

- **Insert each half section through chain links to be joined**
- **Interlock the two sections**
- **Insert tubular spacer in line with drilled holes**
- **Hammer in drive pin on solid surface**

ACCOLOY Body Chain Repair Links are available from your nearby American Chain Distributor in five sizes—$\frac{1}{4}$", $\frac{3}{8}$", $\frac{1}{2}$", $\frac{5}{8}$" and $\frac{3}{4}$". Contact him today or write our York, Pa., office for **Bulletin DH-143.**

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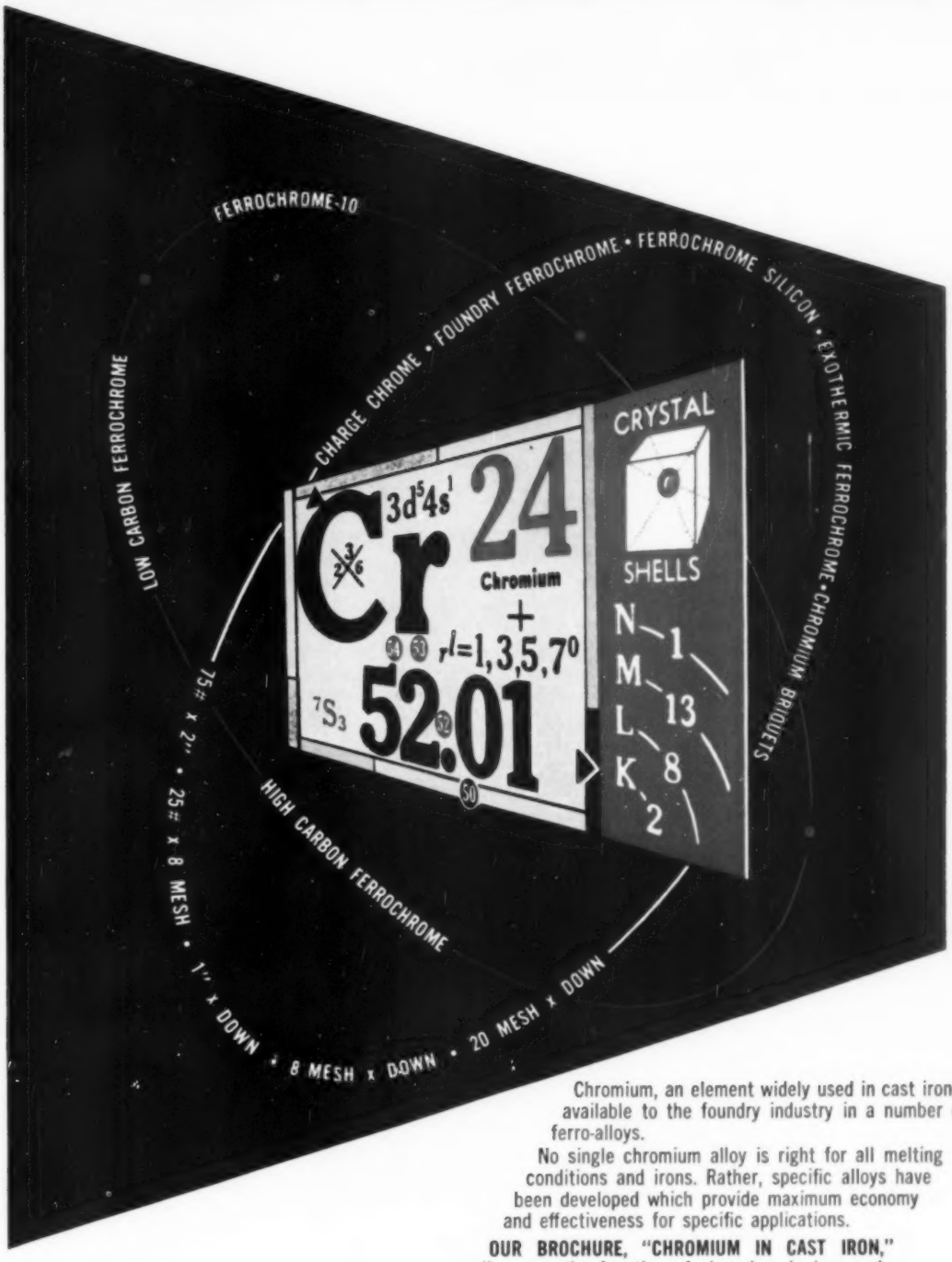
um alloys, there is a logical sequence in the use of these materials to obtain maximum mechanical properties at both room temperature and at subzero service.

Isotope Radiography of Steel Castings, by Mark R. Rosumny, Picker X-Ray Corp. — Essentially, there is little difference between isotope radiography and x-ray radiography. A 2-million-volt x-ray machine produces radiographs very similar to those produced with Cobalt 60, and Cobalt 60 has a slight edge in penetrating power. Similarly, Iridium 192 radiation is slightly more penetrating than a 1-million-volt x-ray machine.

Thus isotopes, when used on material which is suited for their energy, can produce radiographs equal to those produced with x-ray units. For steel castings in which rejectable defects are usually large, the range can be extended down to thin material at reduced sensitivity, but the desired useful information can be obtained.

Sand Control in the Foundry, by Earl E. Woodliff, Foundry Sand Service Engineering Co.—Sand correction and control is a broad program, but because sand responds easily to control, it is fairly simple. The difficulty lies in not having sufficient information about the materials which are used. Unlike metallurgical compositions, sands never reach homogeneity. Most binders and sand grains retain their individual characteristics in any combination. To know the properties of the various materials going into a sand mixture is to know what to expect from the prepared sand. Hidden materials also must be considered.

Molding Properties of Foundry Sand, by G. F. Watson, American Brake Shoe Co.—Moldability is that property which permits packing a sand into a flask so that it faithfully reproduces the pattern shape and detail after the pattern has been withdrawn. It is one of the three prime properties of molding sand, the other two being refractoriness and collapsibility. In the main, three mutually dependent factors affect moldability. They include the kind and amount of clay present, the moisture content of the sand, and the ramming intensity used to form the mold.



Chromium, an element widely used in cast iron, is available to the foundry industry in a number of ferro-alloys.

No single chromium alloy is right for all melting conditions and irons. Rather, specific alloys have been developed which provide maximum economy and effectiveness for specific applications.

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Man to Man

By RALPH L. LEE, *President*

Lee Hobby Foundry
Birmingham, Mich.

"Most leaders are good listeners. After all, the only way a leader can operate is on the basis of information that he acquires from others"

Leadership and Listening

● I CAN SAY honestly that I never have wanted to be a boss. In fact I resigned shortly after being shanghaied into a rather important position of executive and supervisory responsibility. For some reason or other, I never felt that one's position on an organizational pyramid of rank was the only measure of personal accomplishment. Then, too, there isn't much room near the top, but there's plenty of it down below for a fellow to show what he can do.

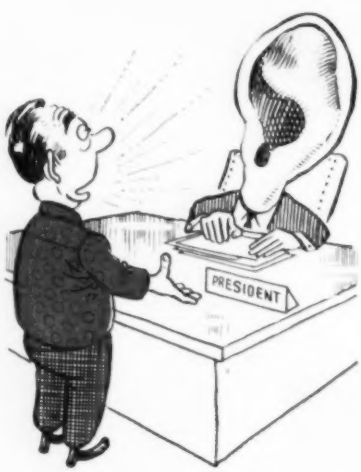
On the other hand, I always have been interested in the reasons that cause some people to be good bosses and others not to. More particularly, I'm interested in the personal traits and ways of doing things of those who have proved themselves to be outstandingly successful in getting things done through others.

What I've discovered in riding this hobby for the past 35 years or thereabout would fill a fairly fat book. In fact, it has. I found that different kinds of leaders are required at different periods in the birth, life, and growth of a company. Using a coarse-mesh riddle, however, I found a few traits common to outstanding leaders.

Leaders Listen—Most of my leaders instinctively listened more than they spoke, and the odd thing is that this characteristic held true even in the wordy field of selling. I discovered that it takes one whale of a lot of courage to be a truly effective listener and that this kind of listening does not mean just keeping the trap shut with your mind on what you are going to say when the other fellow runs out of breath or what you are going to do when he gets the heck out of here.

After all the only way a leader can operate is on the basis of the information that filters into him, either second and thirdhand typewritten gossip or man-to-man and eye-to-eye direct communication. Many vital considerations are mutilated beyond recognition in the process of getting them down on paper. In fact, it takes almost a genius to avoid this pitfall. So, it seems to me, there is little wonder that the art of listening should play an important part in the art of leadership.

Of one thing we can be sure: the mind can concentrate on only one thing at a time. It can hop and skip from thought to thought, but it cannot straddle. Any individual, even the rankest (pyramidwise that is), who sits at his desk signing letters, checks, or requisitions and says to his caller, still signing, "Go ahead, I'm listening," is telling one big fat fib. It can't be done. Besides, even if it could, it would be plain guttersnipe bad manners.



Good leaders are good listeners

Some Kid Themselves — In my opinion any one who is in the habit of pulling such a trick probably is kidding himself into thinking he is a master in considering the source of everything that reaches his ears. Such a fellow, who has everyone pegged, weighed, measured, and evaluated in accordance with his homemade rank sheet, would be the first to rise and click his heels at the approach of some one he considered to be ranker than he.

Then it seems to me that overly ambitious folks pressing to get ahead against competition have their minds so completely devoted to that purpose that it's impossible for them to listen effectively to what the other fellow has to say except that which is favorable to their aims. Such a person actually becomes afraid that the other fellow might have more on the ball than he does and tries to prevent him from having a say by interrupting him or by abruptly changing the subject.

There are instinctive chatterboxes

of course (I'm talented in this respect) who would run on forever if they weren't stopped, but, as paradoxical as it may seem, they soon run out of wind when listened to by a master concentrating on every word they utter. I don't mean pretending to concentrate either. Even chatterboxes come through the froth every once in a while with a hunk of heavy stuff.

Listening Provides Answers—I think, maybe, that the reason my leaders are so good at listening is that they have found answers to vital problems in the most unlikely places. For that reason they consider everyone, regardless of rank or seeming weight, with suspicion. With the suspicion, that is, that they might have something that should be said or that in the saying of something which could have just as well remained unsaid they might spark a chain reaction leading to the long sought answer to a baffling problem.

Employees who are troubled by something, no matter how groundless, and know they can have the ear of an unbiased master at the art of listening are bound to be an entirely different breed of cats from those who know they will be turned deaf ears. Even more importantly, untroubled employees wrapped up in their work virtually can pull rabbits out of hats when they have something to say and know they will be listened to in every sense of the word.

If I were asked, and I am every once in a while, to help pick a promising candidate for a very important post of supervision, where he will get things done through others, the first thing I would want to check would be his ability to listen—to listen with his mind cleared of all the flitting bats and moths of unrelated thoughts which distract many of us, thoughts of what he's going to say when the other fellow gets through or what he's going to do when the other fellow goes.

The same kind of thought-at-a-time concentration required in effective listening solves problems in every other department of running a business. But as far as I'm concerned, I'm not going to kid myself. Mastering the art of effective listening is a lifetime job. All of us have suffered from the lack of it.

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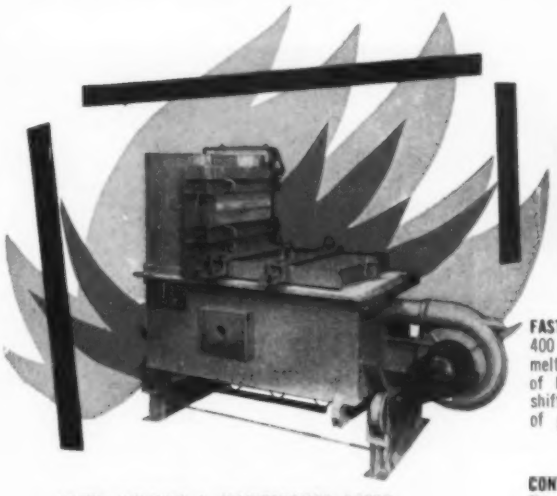

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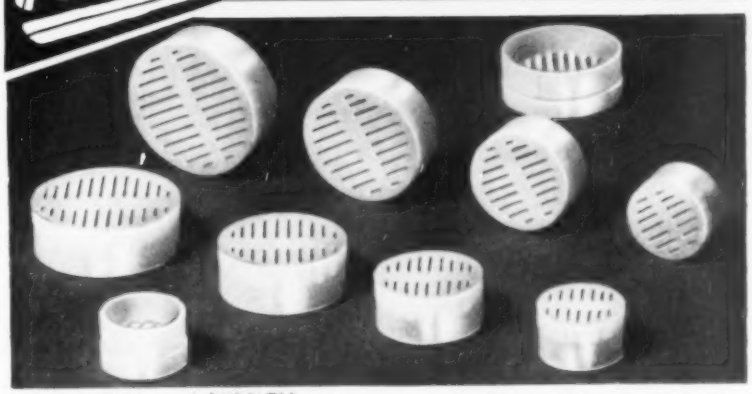

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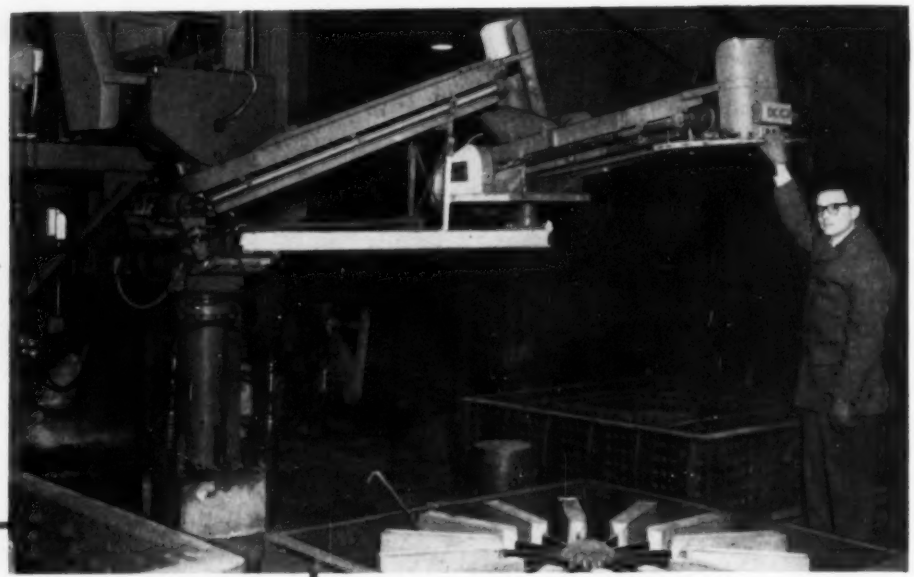
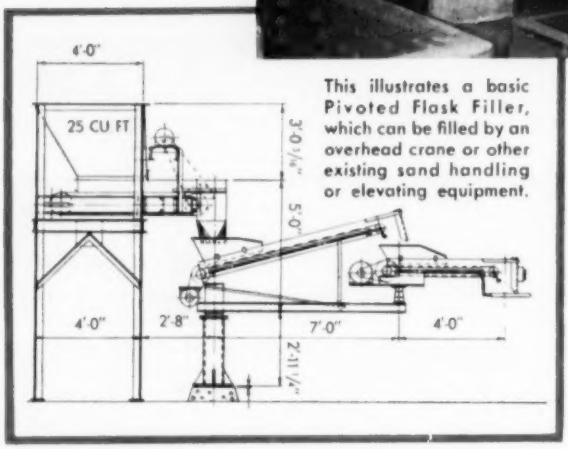
NEWAYGO'S PIVOTING DOUBLE ARM FLASK FILLER

Cuts Large Molds Preparation Time 75%



Double Arm Flask Filler Unit installed in an existing Newaygo Sand Handling System at LEBANON STEEL FOUNDRY CO., Lebanon, Pennsylvania.



This illustrates a basic Pivoted Flask Filler, which can be filled by an overhead crane or other existing sand handling or elevating equipment.

LEBANON reports: "Molds over 60" x 60" are now prepared for the slinger under the flask filler. This consists of facing the pattern with new sand facing, adding about 2 inches of backing sand and ramming into place with air hammers. Gaggers are also added at this point.

"Two common sizes for this operation are 60" x 72" x 42", and 90" x 126" x 48". *We figure conservatively that preparation time on these two sizes and on others in the same range has been cut by 75%.*

"Previously, facing and backing sand was bled off the sand conveyor into wheel barrows or facing sand boxes, which were moved by main bay crane to convenient spots adjacent to the flasks. Sand was then shoveled by hand to prepare the pattern for slinging. Due to the relatively slow method of sand handling we were constantly faced with a congested work area adjacent to the shakeout and slinger.

"The much faster Newaygo Flask Filler Method has virtually eliminated this congestion, resulting in much better use of floor space.

"Having recently (in 1957) installed a Newaygo System, and having lived through the period of change in method, with the normal resistance to change, we were very pleased *two days after we had the Newaygo Flask Filler in operation to have comments from the men as to how much they liked the unit, both from increase in production and the lessened fatigue involved.* We have also found that in removing the facing sand boxes from the operation, we have been able to make better use of the main bay crane."

Complete information and specifications on all Newaygo Foundry Equipment are contained in BULLETIN NO. 56. Send for your free copy.

Mr. Mold Says:

The Newaygo Flask Filler permits using two kinds of sand through the filler by the use of two hoppers, one for facing, and one for backing, — filler capacity up to 50 cu. ft. per minute as needed.

Send for our new 16 mm sound film featuring mechanization. Use of film is FREE.

"Foundry Business is BIG Business"...

NEWAYGO engineering company
NEWAYGO, MICHIGAN

. . . and profitable too, with NEWAY® MOLD HANDLING, SAND HANDLING AND CONDITIONING EQUIPMENT

Casting Specifications Studied at

ANNUAL MEETING

By WILLIAM G. GUDE
Managing Editor
and EDWIN BREMER
Metallurgical Editor

FRANK L. LaQUE
President

● COMMITTEES concerned with specifications for castings were prominent in the numerous committee sessions held during the 62nd annual meeting of the American Society for Testing Materials at Atlantic City, N. J., June 21-26.

Steel—Committee A-1 on Steel recommended the deletion of two grades of steel in Tentative Specification for Centrifugally Cast Ferritic Alloy Steel Pipe for High Temperature Service (A 426-58T). Those grades are CP3 (0.15 max C, 1.45 to 2.05 Cr, 0.60 to 0.80 Mo), and CP3b (0.15 max C, 1.65 to 2.35 Cr, 0.44 to 0.65 Mo).

Cast Iron — Committee A-3 on Cast Iron recommended revisions in Standard Specifications for Gray Iron Castings for Pressure-Containing Parts for Temperatures up to 650 F (A 278-57). Changes include deletion of all explanatory notes and Fig. 3, 4, and 5 relating to manufacture of test bars and to restrictions on permissible variations in diameters of the cast test bars. The committee also recommended withdrawal of Tentative Methods of Testing Chilled and White Iron Castings (A 360-55T) due to nonuse.

The A3 subcommittee on nodular iron is developing new proposed specifications for austenitic nodular iron and for nodular iron valves, flanges, and fittings.

Malleable Iron—Committee A-7 on Malleable Iron recommended that in Standard Specifications for Malleable Iron Castings (A 47-52) and in Tentative Specifications for Pearlitic Malleable Iron Castings (A 220-55T) an informative note or clause be included to indicate that the materials covered in both can be used at elevated temperatures. Reference will be made to published research data which provide detailed information on which the note or clause is based.

The committee is in the process of removing the 1-year test plates exposed at several corrosion sites, and after examination, a report will be prepared. Other specimens are being exposed up to 12 years.

Comparative data on physical properties obtained from cast-to-shape test bars and from Y-block specimens also are being prepared by the committee.

Alloys—Committee A-10 on Iron-Chromium, Iron-Chromium-Nickel and Related Alloys recommended revisions in two specifications. In Standard Specifications for Corrosion-Resistant Iron-Chromium and Iron-Chromium-Nickel Alloy Castings for General Applications (A 296-55) a new grade CA-40 has been added. It contains 0.20 to 0.40 C, 11.5 to 14.0 Cr, and 0.04 max P and S. Minimum tensile strength is 90,000 psi, yield strength, 65,000 psi, elongation 18 per cent, and reduction of area 30 per cent. Silicon contents of grades CB-30 and CB-50 have been increased from 1.0 to 1.5 per cent max.

In Standard Specifications for Heat-Resistant Iron-Chromium and Iron-Chromium-Nickel Alloy Castings for General Applications (A 297-55) the minimum elongation of grade HH has been changed from 15 to 10 per cent. Minimum tensile strength and elongation of grade HI have been changed from 75,000 psi and 15 per cent to 70,000 psi and 10 per cent, respectively. Minimum tensile strength and elongation of grade HK have been changed from 75,000 psi and 15 per cent to 65,000 psi and 10 per cent.

Copper - Base Alloys—Committee B-5 on Copper and Copper Alloys, Cast and Wrought recommended for adoption by the society an extensively rearranged and revised specification B 30-54. This relates to Standard Specifications for Copper-Base Alloys in Ingot Form for Sand Castings, and which in addition to the alloys previously specified now includes one for silicon bronze and two for silicon brass.

Aluminum—Committee B-7 on Light Metals and Alloys, Cast and Wrought recommended revision of Standard Specifications for Aluminum-Base Alloys in Ingot Form for Sand Castings, Die Castings and Permanent Mold Castings (B 179-58) to add alloy 995A (99.5 min Al) with conductivity requirements; to delete alloys SC 64A and SC 64B, and to add alloy SC 64D (3.4 to 4.5 Cu and 5.5 to 7.0 Si) to replace them.

Tentative Specification for Aluminum-Base Alloy Sand Castings was revised by adding additional tempers F and T71 for alloy SG 70A, deleting the higher temperature artificial aging treatment, and adding a melting range for alloy ZC 81A. New alloys SC 51B and SG 70B (high-purity grades) were added to Tentative Specifications for Aluminum-Base Alloy Perma-

nent Mold Castings (B 108-58T).

Magnesium—A revision was made in Standard Specification for Magnesium-Base Alloy Sand Castings (B80-58) by adding alloy K1A (0.40 to 1.0 Zr) which in the F (as-cast) state must meet minimum requirements of 24,000 psi tensile strength, 6000 psi yield strength, and 14 per cent elongation.

In Standard Specifications for Magnesium-Base Alloys in Ingot Form for Sand Castings, Die Castings and Permanent Mold Castings (B 93-58) and in Standard Specification for Magnesium-Base Alloy Permanent Mold Castings (B 199-58) references to specifying inspection at the point at which materials are received, were deleted.

Officers and Directors — Newly elected officers and directors of ASTM were presented at the annual president's luncheon. Frank L. La Que, vice president and manager, Development and Research Div., International Nickel Co., New York, is the new president. He succeeds K. B. Woods, head, School of Civil Engineering, Purdue University.

Miles N. Clair, president, Thompson & Lichtner Co., Brookline, Mass., was elected junior vice president, and A. Allan Bates, vice president of research and development, Portland Cement Association, becomes senior vice president.

New directors are A. B. Cornthwaite, Dept. of Highways, Commonwealth of Virginia, Richmond, Va.; C. L. Kent, Jones & Laughlin Steel Corp., Pittsburgh; H. C. Miller, Public Service Electric & Gas Co., Maplewood, N. J.; C. F. Nixon, General Motors Corp., Warren, Mich.; H. D. Wilde, Humble Oil & Refining Co., Houston; I. V. Williams, Bell Telephone Laboratories Inc., Murray Hill, N. J.; R. D. Thompson, Taylor Instrument Cos.

Awards—The luncheon also was the occasion for the presentation of awards and the recognition of 40 and 50 year members. The ASTM Award of Merit was presented to 13 individuals, including Herbert W. Stuart, United States Pipe & Foundry Co., Burlington, N. J.; George O. Hiers, Baldwin, N. Y., consulting metallurgist retired from National Lead Co.; Mary R. Norton, Watertown Arsenal, Watertown, Mass.; Benoit J. Sirois, Phelps Dodge Copper Products Corp., Bayway, N. J.; George L. Werley, New Jersey Zinc Co., Palmerton, Pa.

Honorary memberships in the society went to Douglas E. Parsons, National Bureau of Standards, Washington, and Jerome Strauss, retired vice president of the Vanadium Corp. of America.

Fifteen individuals and companies were honored for 50-year membership in the society and 44 were recognized for 40-year membership.

Lectures—The annual H. W. Gillett Memorial Lecture was presented by John C. Fisher, Metallurgy and Ceramics Research Dept., General Electric Co., on "The Role of Dislocations in Plastic Deformation of Metals." The Edgar Marburg Lecture, "New Polymers—New Problems," was presented by Herman F. Mark, Polytechnic Institute of Brooklyn.

Following the latter lecture the Charles B. Dudley Medal was presented to R. J. MacDonald, Clevite Research Center, Cleveland, R. L. Carlson, Battelle Memorial Institute, Columbus, Ohio, and W. T. Lank-

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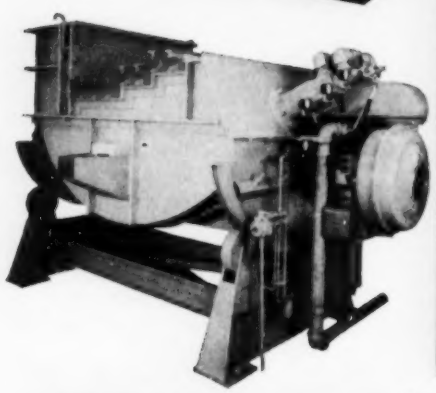
REVERBERATORY
MELTING FURNACE



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2. Melts faster at lower cost—slashes fuel consumption with either oil or gas.

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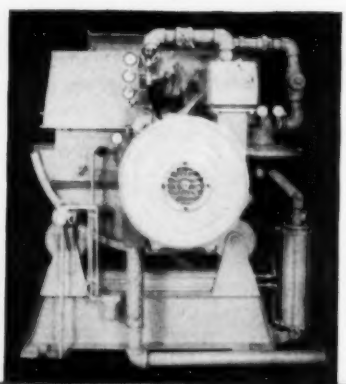
5. Closer control of temperatures and analysis of metals.



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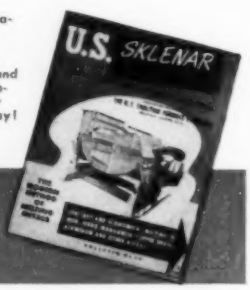


U. S. SMELTING FURNACE CO.
BELLEVILLE, ILLINOIS

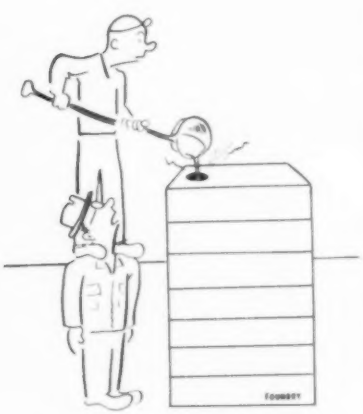
ford, United States Steel Corp., Monroeville, Pa.

The Richard L. Templin Award was made to J. H. Westbrook, General Electric Research Laboratory, Schenectady, N. Y., and the Sam Tour Award went to John B. Rittenhouse, California Institute of Technology, Pasadena, Calif.

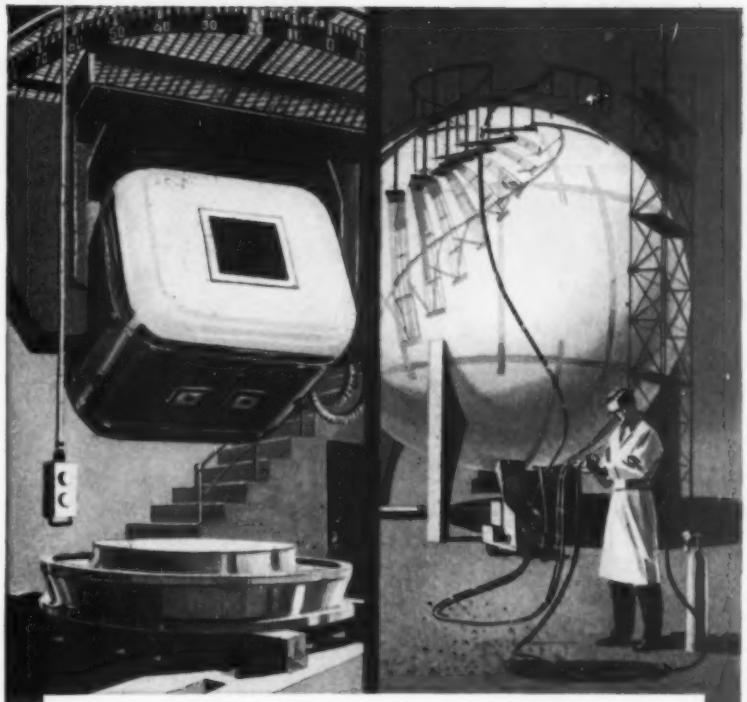
Symposiums—Featuring the technical sessions and symposiums held during the week was a Symposium on Education in Materials sponsored jointly by ASTM and the American Society for Engineering Education. Its nine-man panel included representatives of both industry and education.

It was pointed out that the number of new materials is increasing so rapidly that it is difficult for engineers to be familiar with all of them. At the same time it is desirable that the engineer and designer acquire a better understanding of the scientific makeup of material; therefore the engineer should be trained to be an engineering scientist, not a technician. It was indicated that universities will pay increasing attention in the future to materials engineering.

Symposium speakers included K. B. Woods, Purdue University; Frank L. LaQue, International Nickel Co.; William T. Alexander, Northeastern University; Melvin F. Wood, E. I. duPont de Nemours & Co.; Glen B. Warren, General Electric Co.; Glenn Murphy, Iowa State College; Jacob E. Goldman, Ford Motor Co.; Henry A. Lepper Jr., University of Maryland; Maurice E. Shank, Massachusetts Institute of Technology.



"Next time, don't stack them so high"



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STEEL 20" THICK OR WELDS 100' UP

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NATIONAL LP Air CONVEYOR IN ACTION

View from sand bin shows pipe carrying sand to discharge. Note spilled sand, from clamshell operation, at upper left. Air-Conveyor system provides waste-free delivery.

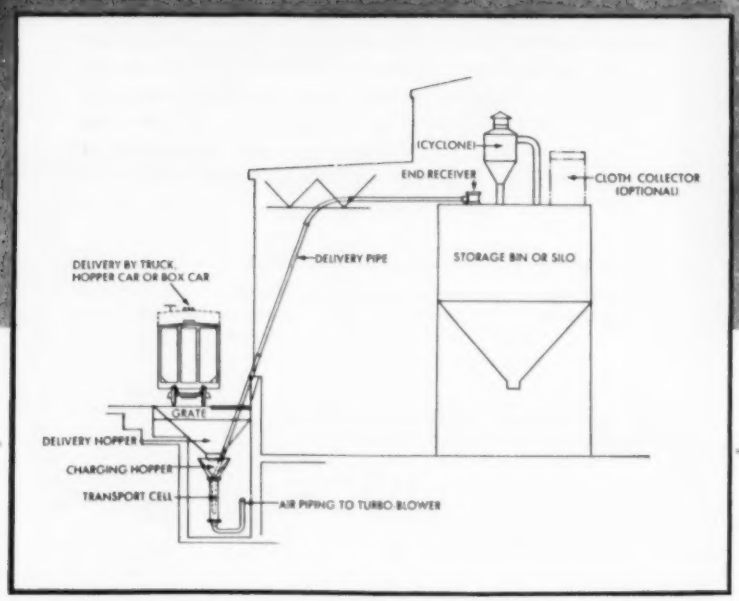
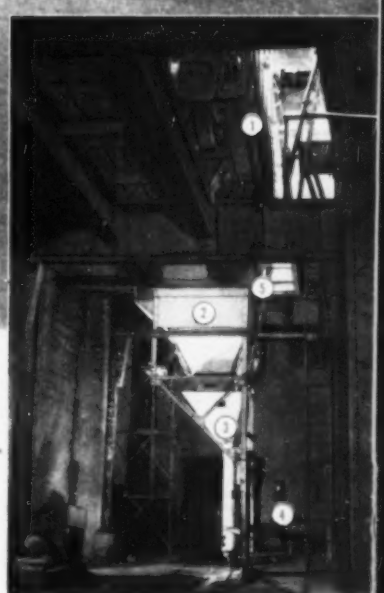


Diagram shows general arrangement of LP Air-Conveyor system for dry sand delivery by truck, hopper car or box car. System also has many uses *within* the foundry.



View from below track showing (1) hopper car, (2) charging hopper, (3) transporter, (4) turbo-blower, and (5) delivery pipe.

How STUDEBAKER-PACKARD saved $12,950 on Sand Delivery Costs

Low cost, low pressure National System slashes maintenance costs, automates dry sand delivery

PROBLEM:

A brisk demand for Studebaker *Larks* had the Studebaker-Packard Corp. foundry at South Bend, Indiana, going at near-capacity. An important sand dryer requiring repair expenditures of $5000 threatened a bottleneck.

SOLUTION:

National recommended the trial of a new low cost, low pressure air-conveyor system for the delivery of new sand. These advantages were cited:

- *Eliminate need for the dryer.* Makes possible dry sand delivery by closed hopper car; eliminating need for dryer and for troublesome paper car covers.
- *Eliminate need for clamshell.* Sand to be discharged direct from car to unit under track, then transported continuously and automatically direct to storage bin, hoppers or belt conveyor.
- *Save time, labor and maintenance* of crane operation. Air-Conveyor is compact, simple and a fully automated system.

As a result of these recommendations, the National LP system was installed.

RESULTS:

During one year of Air-Conveyor operation, Studebaker has:

- Abandoned earlier plans (and need) to overhaul sand dryer. Savings: **$5,000**
- Reduced annual maintenance costs on clamshell system. Savings: **$1,200**
- Eliminated need and labor involved with paper car covers. Savings: **$6,750**

$12,950 represents only an immediate tangible savings to Studebaker. In addition, the Air-Conveyor system now provides all dry sand for core mixers; has reduced manpower requirements; has considerably reduced sand unloading time and contributed to the general improvement of the operation. A second unit, now being installed, will further increase Studebaker's overall savings.

The National LP unit is described at lower left and shown in the photos. It is simple, completely versatile, adaptable to many foundry jobs and occupies but a fraction of the space required for almost any unit it may replace. Its basic cost is considerably less than the amount Studebaker *saved* in one year.

Got a job for Air-Conveyor? Write *National* for further details on either low (LP) or high pressure (HP) Air-Conveyor systems.

IT'S NEW!
IT'S... ANOTHER! PROVEN PRODUCT OF THE PRACTICAL FOUNDRYMAN BY NATIONAL

NATIONAL Air CONVEYOR CORPORATION

A subsidiary of National Engineering Company

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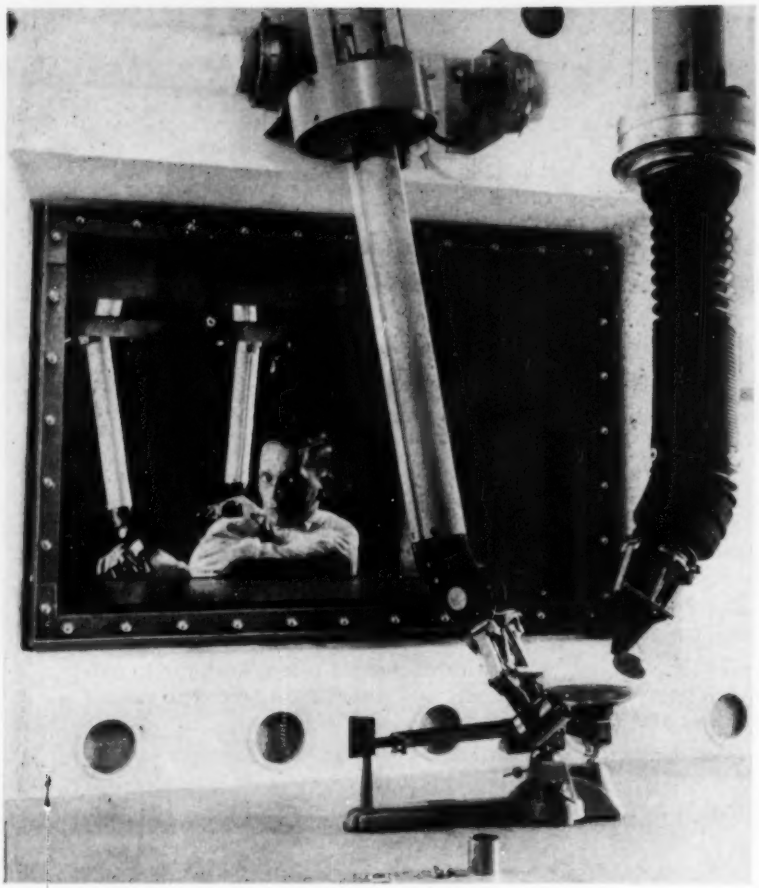
Chicago 6, Illinois

Circle 629 on Page 85



Packaging of Cobalt 60 wafer. Closed stainless steel cup is sealed by an automatic welding machine and shipped in a heavy lead container to user. The technician operates manipulator behind 5-ft-thick window consisting of two glass panes, each 10 in. thick, filled with a solution of zinc-bromide

Picker Research Center Deals in

Isolated Isotopes

● A RESEARCH CENTER which also has products for sale was dedicated at Cleveland recently by the Picker X-Ray Corp., White Plains, N. Y.

The $1 million center is equipped with a complete line of x-ray and isotope radiography units for experimental work, plus complete facilities for research and development in x-ray equipment, nuclear instrumentation, and x-ray diffraction.

In addition, one of its most important functions will be to process and package radioisotopes quickly for industrial and medical users throughout the world.

Picker is the first company to construct a megacurie-level cell to store, process, and ship Cobalt 60 and other isotopes following the Atomic Energy Commission's announcement that it would discontinue encapsulation service for commercial users.

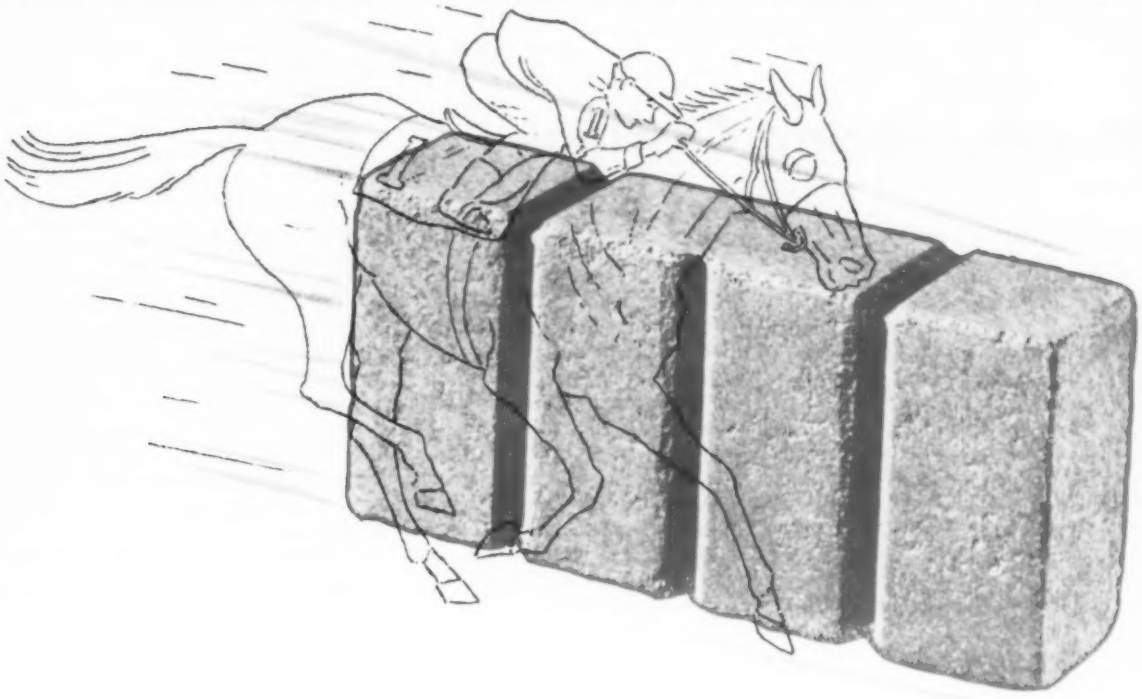
Industrial Radiography — The Center's industrial radiography section has three major purposes: 1. Development of radiographic techniques for inspection of samples supplied by industry. 2. Development of new techniques and uses for radiographic equipment. 3. Training of industrial radiography users. The laboratory can radiograph specimens ranging up to 12-in.-thick steel.

The radioisotope laboratory is equipped to process and package almost any radioisotope and has facilities for storing some 100,000 curies. Packaging is conducted in a cell by manipulators guided by an operator who views the process through a 5-ft-thick window. The window consists of two 10-in. sections of glass filled with a zinc-bromide solution. Rear of the test cell is closed by a 5-ft-thick door weighing 40 tons.

"Gamma Garden" — The vault where radioisotopes are stored in 54 vertical tubes is a heavily shielded rectangular well extending from the first floor level to the basement. The vault also is known as a "gamma garden" because one of its uses will be the study of effects of gamma radiation on any material up to 17 x 17 x 17 in. in size. This is accomplished by placing samples in an opening in the well or in one of the storage tubes.

Second floor of the Center houses the instrument engineering section for research and development work on radiation detectors, electronics and precision mechanical devices. Products of this section include x-ray diffraction and x-ray fluorescence analysis equipment and apparatus for locating, tracing, and measuring radioactive materials.

GOOD BET! All Gray Iron and Malleable Iron Foundries will get



Cleaner Iron when they start using . . .

Famous

CORNELL CUPOLA FLUX

Famous Cornell Cupola Flux is a scientifically prepared mixture of high-grade fluorspar and other materials which creates a chemical reaction in molten iron by greatly increasing slag flow off. Iron is cleaner, castings have greater tensile strength and are easier to machine.

Famous Cornell Cupola Flux is easy to use. With each ton charge of iron, toss one scored brick into the cupola. It's as simple as that! The cost? Just a few cents per ton of metal. For gray iron and malleable foundries when melting in cupolas.

"often imitated but never equalled"

Why it pays to use Famous CORNELL Aluminum, Copper and Brass Flux

- Makes metal pure and clean.
- Permits use of more scrap without danger of dirt, porous places or spongy spots, due to dirty metal.
- Thinner, yet stronger sections can be poured.
- Metal does not cling to the dross as readily.
- Crucible or furnace linings are kept clean and preserved.
- Cleanses molten brass even when the dirtiest brass turnings are used.
- Saves considerable tin and other metals.
- Forms a perfect covering over the metal during melting, prevents oxidation and reduces obnoxious gases to a great extent.

Write for Bulletin 46-A

The CLEVELAND FLUX Company

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Manufacturers of Iron, Semi-Steel, Malleable, Brass, Bronze, Aluminum and Ladle Fluxes—Since 1918

FAMOUS CORNELL FLUXES

Trade Mark Registered

Trouble Shooting

By C. W. AMMEN

Merchandizing Castings

Dear Charlie:

Only too often we get jobs in here that could be produced better and cheaper if more thought had been given to proper pattern equipment. Much is available on proper casting design, but we can find little or nothing on pattern design.

Customers sometimes buy patterns on the basis of price and leave decisions as to how to make them to the patternmaker, regardless of the type or quantity of castings required.

Where we get in trouble is with pattern shops that are out principally to sell patterns, with little regard to their effect on casting cost. As a result of this kind of thing, some customers go to other methods and mediums because of an unrealistic cost comparison based on lousy pattern equipment. And it's hard to sell new patterns after the customer has just bought what he figured he needed. Our question is how best to combat this problem to increase our business and cultivate good will.

Sincerely,
Sam

Dear Sam:

Your problem is widespread and will never really be completely conquered. Some time back, for example, we were asked to bid on some bronze water meter bodies—large affairs weighing upward of 490 lb each. After looking over the pattern equipment, which was an amazing assortment of sweeps, etc., we decided to figure one bid based on existing pattern equipment (designed originally to produce only six castings, but eventually used to produce six castings every 90 days) and another bid based on what we considered would be proper pattern equipment. The difference in casting cost was a shade over 33 per cent less with the new equipment. The second bid we put in, much to the dismay of our competitor, who had been making the job like clockwork for some 25 years.

We invested our own money on new equipment, and the job has been ours ever since. Each time we take the customer's patterns into the shop, we dust a little parting on them and return them with the castings. I don't think the customer or our competitor knows to this day that we are using our own equipment.

This approach is by no means the answer to your question. Many small and some large shops faced with your problem look to the pattern shop and the foundry to solve this difference by close co-operation and working with the customer to give him a good job at a reasonable price.

Any pattern has a decided effect on what the final casting will cost or in some cases whether it can be produced feasibly at all. Instead of just going ahead with a job, you should decide what the pattern equipment should be when the design is in a rough-sketch stage. I do not feel that pattern shops are at all to blame for this difficulty. Most pattern shops gladly will advise the customer or for that matter will make the equipment any way he wants it.

Patternmakers are in the same boat when it comes to bidding. One shop will figure one way and bid accordingly, whereas a competitor figures another way and bids on that basis. Often a difference of many hundreds of dollars pops up in bids on pattern equipment to produce the same casting. The customer, unless he is fully qualified—and in most instances he is not—is thrown for a loss. More and more firms which buy castings are hiring casting purchasing men trained in the foundry game to buy for them.

Selling Bananas—Now, back to the foundry. If the foundry hires a salesman—and many do not—he spends two weeks walking around the foundry. This job, he is told, is to familiarize him with the foundry. Then he is off to sell like a banana vendor, by the pound. I don't care whether you are the best darned foundryman who ever made a mold (and I am sure you are the best), it's not making patterns and castings that brings the money in. Merchandizing is the key to selling castings or anything else.

To illustrate, Foundry A & Foundry B have done business in the same town for the same number of years. Plant A makes top-quality castings, and the owner is the complete sales organization. This company does O.K., but Plant B is loaded with business and has to expand every so often to keep up with orders, even though its quality is not as high as that of "A."

The chief reason for this situation is that Plant B is run by a smart businessman who has 14 states covered with seven salesmen. And the seven have been schooled to sell castings, not bananas. They are selling service and, among other things, are qualified to advise the customer on pattern design and cost relative to casting cost.

Merchandizing Sells—The many other mediums and materials which

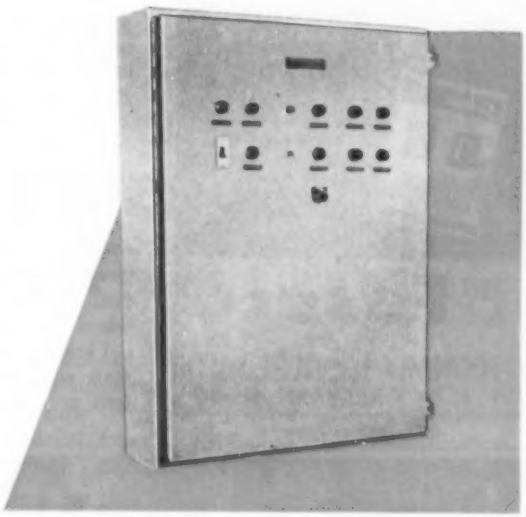
HARTLEY ▸ *the FIRST* *the FOREMOST* *the FINEST*

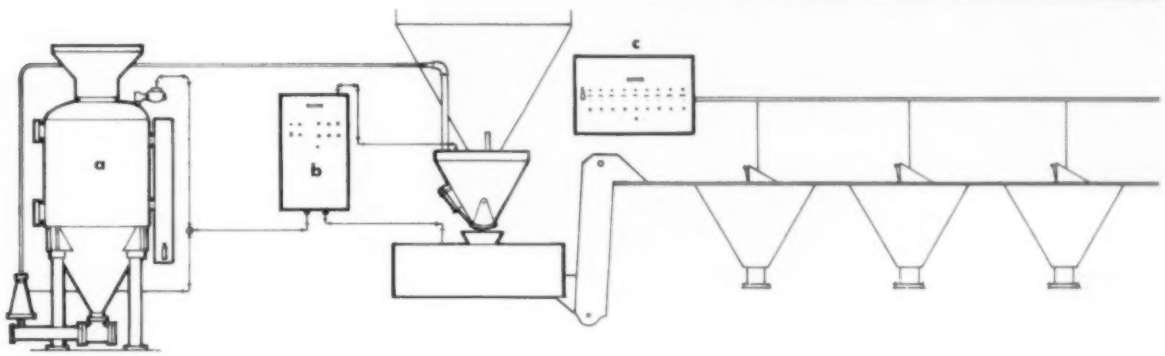
Hartley Sand Controller, Series XII, operates all — or any combination of:

Moisture Controls • Mixer Timers • Bond Feeders • Bin Controls • Mixer Selectors • Pneumatic Transporters

. . . *in complete Foundry Sand Automation*

A single Hartley control cabinet *delivers* the precision impulses that remove guesswork, loss of time and lack of uniformity in foundry sand systems. From transporting raw sand to the control of moisture, bond additions and cycling in the sand reconditioning process, there is no waiting, no waste, no wondering. What's more, it is not necessary to automate your complete operation at once. Hartley equipment can be added and interlocked in stages. Let the savings from one unit pay for another until your sand system is fully automated.





Line drawing shows a typical Hartley installation:
(a) Bond Feeder, (b) Series XII Sand Controller, (c) Sand Level Control.

Complete specifications and recommendations concerning special problems will be sent promptly.

HARTLEY *Controls* CORPORATION • NEENAH • WISCONSIN

Circle 631 on Page 85

If you're troubled with gas porosity, oxides or poor fluidity in iron castings, try

Foseco FERROGEN

scavenging compound

This bulletin gives the details. Send for your free copy today.

Foseco

FOUNDRY SERVICES, INC.
P. O. Box 8728, Cleveland 35, Ohio

Circle 632 on Page 85

have cut into what were considered foundry markets are not necessarily superior or in every case cheaper. They are the product of selling with good merchandizing. The foundry which does not get out and do a good job of merchandizing is a lost ball in high weeds, no matter how cheap the product or how high the quality. The old saying "Build a better mouse trap and the world will beat a path to your door" is bunk.

We are living in the day of the specialist, not that of the all-round molder, patternmaker, and designer wrapped up in one. Pattern designing is a highly developed, specialized field and requires considerable, well rounded knowledge of all phases of the art of founding and engineering. It does not require the designer to be able to know how to make the pattern (physically) or to be a molder. The finest, smartest superintendent I ever worked under was a lousy molder, but, brother, he knew what and when and how to get things done.

I know a really good casting salesman who has yet to make a pattern or casting, but is thoroughly qualified to tell you how the pattern and castings should be made to produce them economically and of good quality. The men in the shop have a lot of respect for him and have found out from experience that he knows what he is talking about.

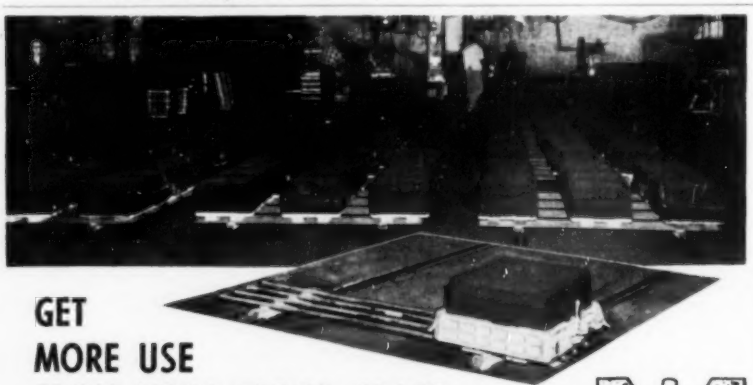
The moral is that if you want to do more business well, concentrate on merchandizing as well as on production. Get yourself a good sales engineer, or train one. When you sell, sell all the way, including the patterns. When the time is right, a good salesman calls in the pattern source and the foundry supervision and settles on what, how, and how much. Merchandizing and sound business management make the wheels go around.

Sincerely,
Charlie

Magnesium Association Elects New Officers

Otis Grant, vice president, Magnode Products, Inc., Trenton, Ohio, was re-elected president of the Magnesium Association at its annual meeting. Other officers also re-elected to a second term were Charles Howe, president, Hills-McCanna Co., Chicago, and John Thomson, vice president, Dominion Magnesium Ltd., Toronto, Ont., Canada, vice presidents; and Norman Gzowski, president, Garfield Alloys Inc., Cleveland, treasurer. Jerry Singleton again was named executive secretary.

Newly elected to the Association's Board of Directors for three-year terms were J. E. Pepall, president, Magnesium Co. of Canada, Montreal, Canada; R. D. Taylor, assistant to the vice president, Federated Metals Div., American Smelting & Refining Co., New York; Edward Christiansen, president, Magnesium Co. of America, East Chicago, Ind.; William Wilson, president, American Light Alloys Inc., Little Falls, N. J.; and Elmer Lanfranke, vice president, Rolle Mfg. Co., Lansdale, Pa. Louis Favorite, vice president, Aluminum Co. of America, Pittsburgh, was elected to the Board to fill the unexpired term of Wiser Brown, Alcoa, retired.



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Nomad Recessed Conveyors give greater flexibility to your operation. The molding area can be used for floor molding or can be quickly changed to a palletized floor depending upon the job. Since the rails are embedded in concrete for stability, the whole area can be worked freely by a front-end loader.

INCREASE PRODUCTIVITY AND SAVE ON MANPOWER — Molders set molds on wheeled pallets which "roll away" smoothly on rails saving hard physical labor and allowing greater mold production.

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Circle 633 on Page 85

Coming in the September issue: A special report on . .

heat treatment

of cast metals

FOUNDRY magazine announces another editorial report of major significance. Here, all in one issue, September 1959, will be practical information that offers you new approaches to your heat treating problems. This special editorial report will cover the Solidification and Heat Treatment of . . .

Aluminum and Magnesium Alloys	by Edward E. Stonebrook Aluminum Co. of America Cleveland
Steel and Malleable Iron	by B. C. Yearley National Malleable & Steel Castings Co. Cleveland
Gray Iron, Ductile Iron and Alloy Irons	by Ralph Clark Union Carbide Metals Co. Cleveland
Copper-Base Alloys	by William Rudin Elesco Smelting Corp. Chicago
A General Review of Principles	by Prof. John F. Wallace Case Institute of Technology Cleveland

The report will examine the latest ideas, methods, and theories of heat treatment. Here's another FOUNDRY feature that you won't want to miss!

SEPTEMBER ISSUE OF

FOUNDRY

A PENTON PUBLICATION

Literature for Foundrymen

For More Information Use Reply Card—Page 85

Cupola Blowers

Bulletin FC-158 provides selection tables, performance data, and design features for rotary positive and centrifugal blowers.—**Roots-Connersville Blower,** a division of **Dresser Industries Inc.,** 900 W. Mount St., Connersville, Ind.

For More Details Circle No. 407—Page 85

Diecasting Machines

Catalog presents descriptions of the company's diecasting machines in a variety of models. Specifications data sheet is included.—**American Die Casting Machinery Co.,** 1516 W. Thomas St., Chicago 22, Ill.

For More Details Circle No. 408—Page 85

Flexible Molds

Brochure CDS-191 deals with RTV silicone rubber molds for plastic tooling and plastic model making. Case histories and a typical sequence of operations required in preparation and application are presented.—**Silicone Products Department, General Electric Co.,** Waterford, N. Y.

For More Details Circle No. 409—Page 85

Aerosol Products

Company's complete line of aerosol-packaged products for maintenance and production operations is described in catalog. Includes finishes, lubricants, coatings, and cleaners. — **Industrial Supply Div., Sprayon Products, Inc.,** 2075 E. 65th St., Cleveland 3, Ohio.

For More Details Circle No. 410—Page 85

Bucket Cranes

Design characteristics of the company's bucket cranes are described in Bulletin B-102. Data sheet is included.—**Northern Engineering Works,** 210 Chene St., Detroit 7, Mich.

For More Details Circle No. 411—Page 85

Vibrating Screens

Descriptive data, dimensions, and other specifications for one, two, and three-deck vibrating screens are given in Bulletin 757. —**Stephens-Adamson Mfg. Co.,** Aurora, Ill.

For More Details Circle No. 412—Page 85

Gas Manifolds

Catalog 829 describes manifolds for industrial gases and gives data on capacities, dimensions, and arrangements, along with general information on the advantages of manifolding.—**Air Reduction Sales Co.,** a division of **Air Reduction Co.,** 150 E. 42nd St., New York 17, N. Y.

For More Details Circle No. 413—Page 85

Electromagnetic Pulley

Bulletin 1011 explains the application of magnetic pulleys in modern process industries and outlines the principle of operation. A tabulation of approximate weights per cu ft of materials that often are handled on belt conveyors also is included.—**Stearns Magnetic Products,** 635 S. 28th St., Milwaukee 46, Wis.

For More Details Circle No. 414—Page 85

Carbon Dioxide Welding

Information on welding of mild steel and low-alloy steels with carbon dioxide shielding gas is available in Catalog ADE 882. Manual contains illustrated descriptions of conventional CO_2 and dip transfer CO_2 processes.—**Air Reduction Sales Co., division of Air Reduction Co.,** 150 E. 42nd St., New York 17, N. Y.

For More Details Circle No. 415—Page 85

Fire Extinguishers

Brochure P-48 describes dry chemical fire extinguishers and tells how to use and recharge them.—**Walter Kidde & Co.,** Main Street, Belleville, N. J.

For More Details Circle No. 416—Page 85

Duct Fans

Dimensions and performance and construction data on direct-drive duct fans and belt-drive units with adjustable driver sheaves are given in Bulletin A-114A.—**Hartzell Propeller Fan Co.,** Piqua, Ohio.

For More Details Circle No. 417—Page 85

Did You Miss These?

Here is a list of popular literature items offered in recent months:

MOLDING SAND COOLER (Bulletin 594/4)—International Automation Corp., Ann Arbor, Mich. Circle 401, Page 85.

MOLYBDENUM IN STEEL—Climax Molybdenum Co., New York 36, N. Y. Circle 402, Page 85.

SILICONES ("1959 Guide to Dow Corning Silicones")—Dow Corning Corp., Midland, Mich. Circle 403, Page 85.

PATTERN LETTERS—H. P. Maughlin Co., Columbus 8, Ohio. Circle 404, Page 85.

DUCTILE IRONS ("Engineering Properties of Ni-Resist Ductile Irons")—International Nickel Co., New York 5, N. Y. Circle 405, Page 85.

SHELL SAND LUBRICANTS ("Technical Data Report on Shell Sand Coating")—Nopco Chemical Co., Metals Div., Newark, N. J. Circle 406, Page 85.

Fork Truck

Operating information, design specifications, and general engineering data are stressed in a folder on company's 3000-lb capacity, electric-powered fork trucks.—**Elwell-Parker Electric Co.,** 4205 St. Clair Ave., Cleveland 3, Ohio.

For More Details Circle No. 418—Page 85

Plate Magnets

Bulletin 1074 gives detailed selection data to aid in choosing a permanent plate magnet for existing chutes, ducts, conveyors, or other material handling equipment.—**Stearns Magnetic Products,** 635 S. 28th St., Milwaukee 46, Wis.

For More Details Circle No. 419—Page 85

Hose Fittings

Complete information on fittings for industrial rubber hose used to handle air and on spray and welding equipment is presented in Bulletin 198.—**Hose Accessories Co.,** 2704 N. 17th St., Philadelphia 32, Pa.

For More Details Circle No. 420—Page 85

Skin Creams

Bulletin 0403-4 describes three creams designed to give protection against many skin irritants encountered in industry.—**Mine Safety Appliances Co.,** 201 N. Braddock Ave., Pittsburgh 8, Pa.

For More Details Circle No. 421—Page 85

Air-Cooled Compressors

Specifications, cross-sectional drawings, and a rundown on vital components of air-cooled compressors are offered in Bulletin A-56.—**Joy Mfg. Co.,** Oliver Bldg., Pittsburgh 22, Pa.

For More Details Circle No. 422—Page 85

Finishing Processes

Catalog describes precision mechanical finishing and automatic finishing processes. It includes illustrations, descriptions, and data on dimensions, capacities, and recommended uses of the various types of equipment.—**Roto-Finish Co.,** 3700 Milham Rd., Kalamazoo, Mich.

For More Details Circle No. 423—Page 85

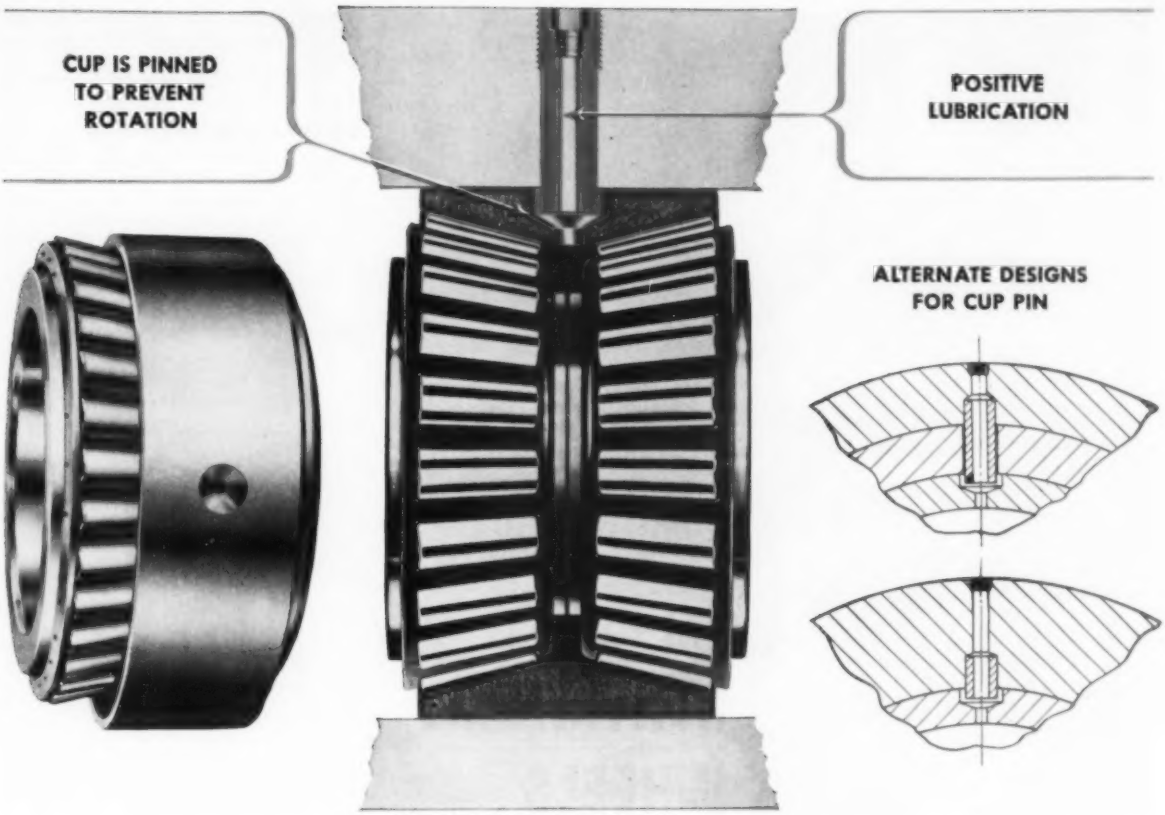
Battery Chargers

Form 6276 describes company's space-saving, multi-circuit chargers for electric truck batteries. Various models and operation procedures are described. **Exide Industrial Div., Electric Storage Battery Co.,** Rising Sun and Adams Aves., Philadelphia 20, Pa.

For More Details Circle No. 424—Page 85

Infra-red Equipment

Specifications and prices on aluminum-ceramic lampholders and tubular quartz, fluorescent-type, infrared lamps are given



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REDUCES WEAR AND POUNDING
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Now you can get a new Timken® bearing—first of its kind developed for floating bearing positions—that answers the problem of excessive wear from creeping and pounding in gear drives, spindles and many other applications. It's a pin-cup, double-row tapered roller bearing. Manufacturers can assemble and adjust gear drives, then merely set the pin. Result is a bearing that floats endwise but cannot turn in the housing. It greatly reduces wear, provides for continuous, positive lubrication. This new Timken bearing gives you all these advantages for those applications where there is an inherent tendency for the cup to creep or turn in the housing.

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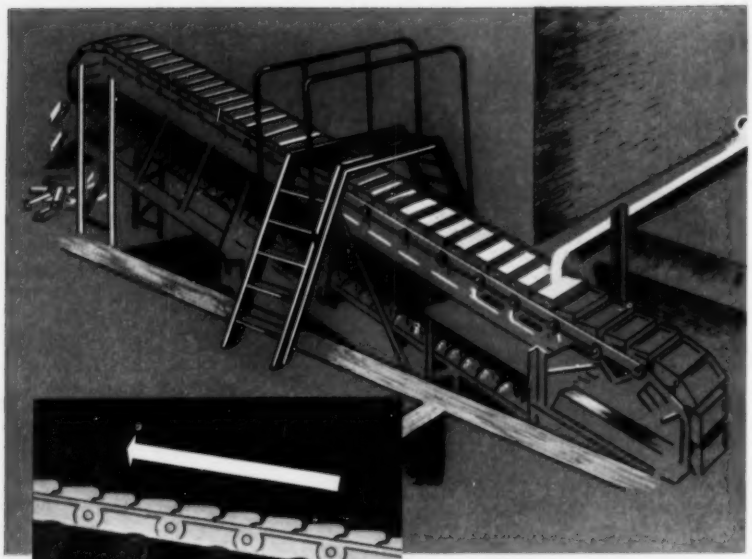
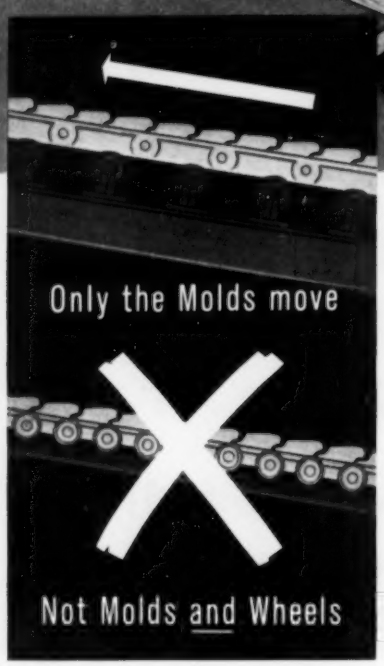
This symbol on a product means its bearings are the best

Circle 634 on Page 85





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Eliminating 80% of the parts of conventional pig casting machines, this simplified design results in sharp reductions of lost production time and maintenance costs. Since the idler wheels are mounted on anti-friction bearings on the stationary part of the frame, not on the molds, they are positioned as far as possible from hot metal.

Capacities for the machine illustrated: from 3 to 50 tons per hour. Sizes: 15 to 125 feet. Other Bailey Pig Machines are made in single and double strand types and in capacities to 250 tons per hour. Both types feature stationary wheel construction.

WILLIAM M. Bailey COMPANY
ENGINEERS
LEADERSHIP THROUGH QUALITY
1221 BANKSVILLE ROAD PITTSBURGH 16, PA.

Circle 635 on Page 8

in data folder.—**Miskella Infra-Red Co.**, E. 73rd & Grand Avenue, Cleveland 4, Ohio.

For More Details Circle No. 425—Page 85

Synthetic Diamond Wheels

Facts and recommendations on man-made diamond wheels, characteristics of man-made diamonds, diamond wheel shapes, and application recommendations are offered in brochure.—**Carborundum Co.**, Niagara Falls, N. Y.

For More Details Circle No. 426—Page 85

Silicon in Cast Iron

Bulletin describes role of silicon in foundry practice. Function of silicon in cast iron, description of various alloys

designed for addition to the melting furnace, and discussion of silicon alloys for inoculation are covered.—**Ohio Ferro-Alloys Corp.**, Canton, Ohio.

For More Details Circle No. 427—Page 85

Gearmotors

The functions of gearmotors and fluid drives are described and engineering and selection data, with service classifications and application information, are contained in Book 2747.—**Link-Belt Co.**, Dept. PR, Prudential Plaza, Chicago 1, Ill.

For More Details Circle No. 428—Page 85

Vibrating Feeders

Bulletin 1000 shows typical examples of the many sizes and capacities of air-powered vibrating feeders offered by the company.—**Cleveland Vibrator Co.**, 2828 Clinton Ave., Cleveland 13, Ohio.

For More Details Circle No. 429—Page 85

Air Hose

Bulletin 1 gives specification data on the company's air hose and on special line of fittings.—**Synflex Products Div., Samuel Moore & Co.**, Mantua, Ohio.

For More Details Circle No. 430—Page 85

Aluminum Stress Analysis

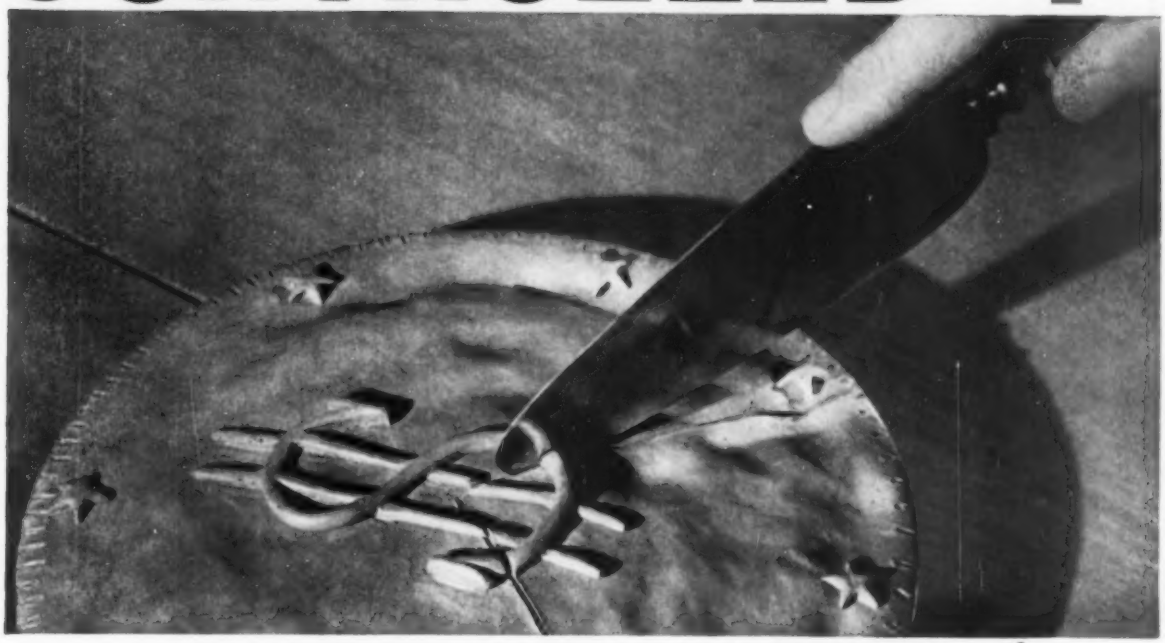
Vol. 7, No. 2 of *Magnafacts* includes information and illustrations showing how stress analysis can improve design of aluminum castings.—**Magnaflux Corp.**, 7300 W. Lawrence Ave., Chicago 31, Ill.

For More Details Circle No. 431—Page 85

Bucket Elevators

Aluminum, wood, steel, and stainless steel bucket elevators are described in

CONTROLLED "T"®



CUT YOURSELF A SLICE OF *profits!*

If you now use hard (chilled) iron abrasives—and almost half of all abrasives used still fall into this category—may we suggest **CONTROLLED "T"®**, with its exclusive and unique properties?

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CONTROLLED "T"®, made to a specific BHN, is an "iron fist in a velvet glove." Its controlled specifications are such that you enjoy the speed and cutting action of chilled, without the disadvantages of rapid breakdown and high maintenance costs. Savings: as much as 50% on consumption, as much as 40% on maintenance! You can cut yourself a generous slice of profits with these important cost-cutting features of **CONTROLLED "T"®**. If this sounds like a fairy tale, try us! We won't upset your operations with a test, there is a simple and inexpensive way to tell. Cost-conscious customers have been enjoying these extra profits for over a decade!

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Circle 636 on Page 85

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Chief Keokuk has a magnetic way about him. Just ask Junior and Princess Wenatchee!

Bulletin 22-D. A variety of heads, boots, buckets, and belt or chain designs are illustrated.—**Sprout, Waldron & Co.,** 130 Logan St., Muncy, Pa.

For More Details Circle No. 432—Page 85

Pneumatic Gun Material

Applications, properties, and installation procedures are described in Booklet R-48 for a chrome-base refractory material, engineered for placement by pneumatic gun.—**Babcock & Wilcox Co.,** 161 E. 42nd St., New York 17, N. Y.

For More Details Circle No. 433—Page 85

Overhead Cranes

Bulletin ED-205 presents engineering data for overhead electric traveling cranes. Dimension and capacity tables are included for several types of cranes.—**Northern Engineering Works,** 210 Chene St., Detroit 7, Mich.

For More Details Circle No. 434—Page 85

Dust Collector

Bulletin 272-B covers the operating principle, application, design, construction, operation, installation, and arrangements of the company's Type D dust collector.—**American Air Filter Co.,** 215 Central Ave., Louisville, Ky.

For More Details Circle No. 435—Page 85

Management Information

Brochure on supervisory growth contains several interesting and useful pieces of literature designed to help foremen and supervisors with their managerial duties.—**Elliott Service Co.,** 30 N. MacQuesten Parkway, Mount Vernon, N. Y.

For More Details Circle No. 436—Page 85

Electric Torch

Brochure presents illustrations and specifications for company's torch designed for heavy-duty foundry applications such as pad washing.—**Arcair Co.,** Box 431, Lancaster, Ohio, or Box 3227, Bremerton, Wash.

For More Details Circle No. 437—Page 85

Protective Coatings

Chart compares corrosion-resistant maintenance protective coatings for acid, alkali, solvent, water, weathering, flexibility, impact and abrasion, and temperature conditions.—**Carboline Co.,** 32 Hanley Industrial Court, Brentwood 17, Mo.

For More Details Circle No. 438—Page 85

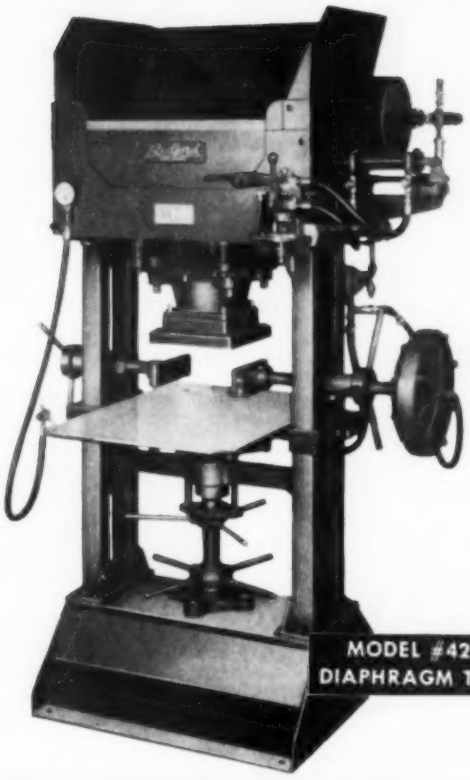
Diecasting Pouring Ladles

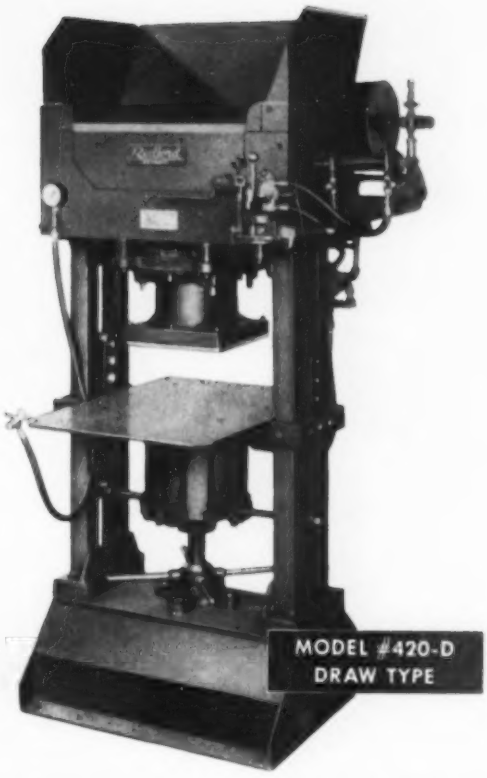
Brochure describes stainless steel pouring ladles for diecasting machine use. Specification data and price list are included on skimmers as well as ladles.—**Spincraft Inc.,** 4141 W. State St., Milwaukee 8, Wis.

For More Details Circle No. 439—Page 85

Ferrocolumbium

Use of ferrocolumbium in carbon and low-alloy steels, high-temperature alloys, stainless steel, and plain-chromium steels is discussed in folder. Expected recoveries, analysis, and sizes of the alloys





Redford CORE BLOWER AND CORE SHOOTER

Here is a core making machine that is setting new standards in versatility and performance. The #420 Redford is equipped *to make cores up to 20 lbs. using any type binder.* Proven core blowing practices may be continued to do the most intricate work and to assure maximum production. Tough sand mixes which do not readily lend themselves to blowing can be used in ramming or shooting cores.

Core shooting requires a fast acting machine having sufficient capacity to propel sand at high velocity through a large shoot head opening. The large shoot head opening offers little resistance to the flow of sand and allows any sand to be rammed into suitable open cavity core boxes ahead of the propelling air.

With the #420 Redford we offer a tool that allows you the widest choice of application. It is a properly balanced combination of standard Redford practices that makes possible a low cost machine of greater usefulness and versatility to meet today's core room requirements.

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For Complete Information write for
BULLETIN #42

Circle 638 on Page 85

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MELTING POTS
INGOT MOLDS

Designed by
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for FOUNDRYMEN

You'll find it pays to standardize on Acme melting pots and ingot molds. They reduce down time and replacement costs because they're cast from a special iron formula that combines strength with high temperature resistance. They improve quality and reduce rejects, too, because they're designed for even heat distribution without hot spots. If you melt any non-ferrous metals, take advantage of our more than 30 years' experience in this field. It's your assurance of consistent high quality in Acme melting pots and ingot molds . . . designed *by* foundrymen, *for* foundrymen.

Quick delivery anywhere in the United States. Write for size list showing 40 standard sizes.

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are listed.—**Union Carbide Metals Co., division of Union Carbide Corporation,** 30 E. 42nd St., New York 17, N. Y.

For More Details Circle No. 440—Page 85

Storage Batteries

"Facts About Storage Batteries" is an informative booklet which discusses battery construction, chemistry, maintenance, and other battery facts.—**Exide Automotive Div., Electric Storage Battery Co.,** Box UF 6266, Cleveland 1, Ohio.

For More Details Circle No. 441—Page 85

Lift Truck Control

Brochure details company's monotrol lift truck control system. The co-ordi-

nated system reportedly sets new standards for safety and performance.—**Hyster Co.,** 1003 Myers St., Danville, Ill.

For More Details Circle No. 442—Page 85

Stress-Corrosion Cracking

Aluminum bronze alloy used to combat intergranular stress-corrosion cracking is described in bulletin. The alloy's welding characteristics and physical properties are listed, with data on forming, drawing ,and machining procedures. —**Ampco Metal, Inc.,** 1745 S. 38th St., Milwaukee 46, Wis.

For More Details Circle No. 443—Page 85

Horizontal Bandsaws

Series of data sheets gives specifications and descriptive data on several models of horizontal metalcutting bandsaws and accessories.—**W. F. Wells & Sons,** Three Rivers, Mich.

For More Details Circle No. 444—Page 85

Fork Trucks

Engineering data on electric fork trucks in capacities from 12,000 to 20,000 lb and on truck components are given in folder. —**Elwell-Parker Electric Co.,** 4205 St. Clair Ave., Cleveland 3, Ohio.

For More Details Circle No. 445—Page 85

Tooling Plastics

Bulletin outlines procedures to assist foundries to adopt plastics to their requirements. A list of materials for foundry trial kits is included.—**Furane Plastics, Inc.,** 4516 Brazil St., Los Angeles 39, Calif.

For More Details Circle No. 446—Page 85

LET'S LOOK at

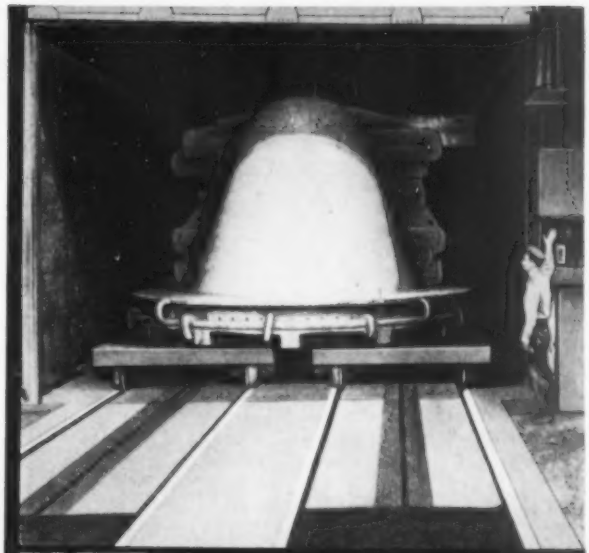
OVENS for every baking requirement

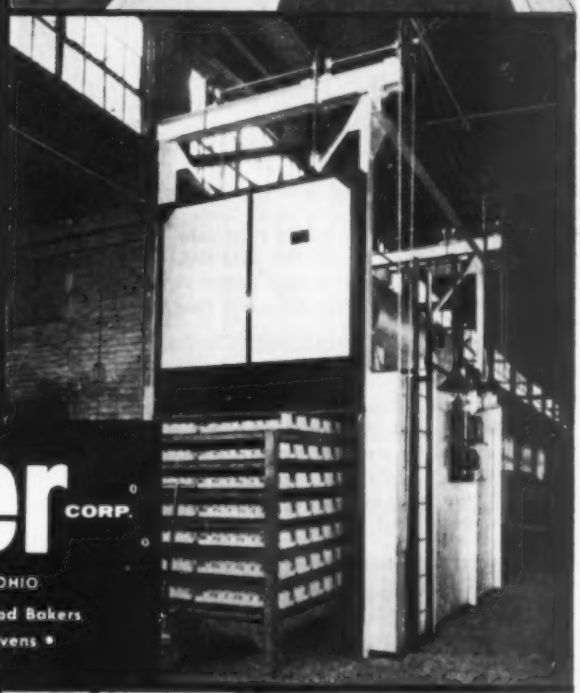
OVENS that will be faster and less expensive to operate

OVENS that are designed to best fit your operation

Carl Mayer designs and manufactures all types of ovens as well as "specials" to meet unusual operating conditions. Most incorporate the Carl Mayer recirculating heating system with sealed combustion chamber that keeps gases from prematurely escaping into the load area. Cores and molds are baked evenly with no burning. Temperatures are always under control.

Write for Bulletin 53-CM





TOP RIGHT—This large car type mold oven is installed at Pittsburgh Steel Foundry. Its special triple slotted panel construction reduces heat loss 1/3. Fuel savings up to 50% over old conventional methods are possible. Drying time is often cut in half and temperatures are uniformly controlled.

MIDDLE RIGHT—This rack type core baking oven is at the Fremont Foundry Co., Fremont, Ohio. It is equipped with a recirculating combination gas-oil fired heating system.

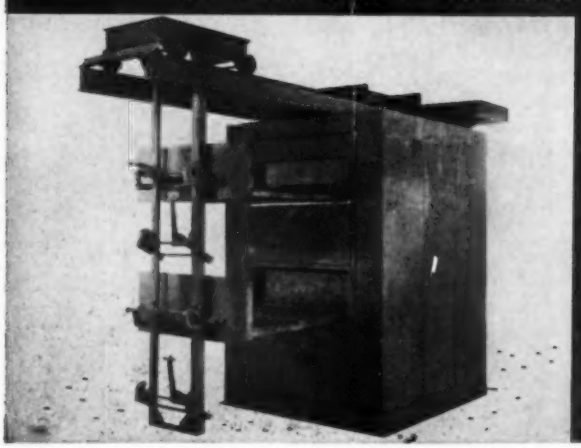
BOTTOM RIGHT—Vertical Core Oven (unloading position) at A. C. Williams Company, Ravenna, Ohio. This oven is 11'-0" wide x 11'-0" deep x 45'-0" high.

BELOW—Our standard rolling drawer type core baking oven. The heating equipment (not shown) may be mounted on floor beside unit or on the roof. Particularly adaptable to brass and aluminum foundries.

THE **carl mayer** CORP.

20800 CENTER RIDGE ROAD CLEVELAND 16, OHIO

OTHER PRODUCTS: Heat Treating Ovens and Furnaces • Rod Bakers • Welding Rod Ovens • Paint and Ceramic Drying Ovens • Special Processing Equipment and Accessories



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News Views

TROPHY WINNER: John V. Scherer, Pittsburgh Steel Foundry, right, first winner of Pennsylvania Glass Sand's continuous golf trophy, receives his award from John J. Brown, Pennsylvania Glass Sand Corp. The gold cup will be awarded each year to the lowest-scoring golfer at the annual outing of Pittsburgh Chapter, American Foundrymen's Society

PORTABLE BUGGY: "Burning Buggy" built and used by the Maintenance Department, Steel and Tube Div., Timken Roller Bearing Co., carries an acetylene unit. The buggy can be moved by crane or fork lift truck or can be rolled into position. Tanks are chained to the frame and are removed only when empty. Fire extinguisher (left, on buggy) is a permanent part of unit

BUCKET IDLER: This 28-ton compound steel casting, made by Ellicott Machine Corp., Baltimore, is one of two such units recently shipped to Indonesia. Welded with nearly one mile of welding wire, it is a bucket idler for use on a placer dredge excavating tin-bearing sand and gravel

REACTOR COMPONENT: High-alloy-steel top ring cast for the pressure vessel of a nuclear reactor is ready for x-raying with an Allis-Chalmers 24-million volt betatron at Electric Steel Foundry Co., Portland, Oreg. For this 18-8 stainless steel casting, 34,000 lb of metal were melted. Poured weight was 30,000 lb, clean weight, 15,000 lb

Very Handy!

750 LENS CLEANING CABINET

Attached to wall at strategic locations, this small, compact (12″ x 9″ x 6″) cabinet provides all necessary lens cleansing and anti-fog materials. The clean tissue dispensed does a far better cleaning job than a handkerchief or gritty or oily rag. No danger of scratching valuable lenses. Made from selected hardwood — cabinet won't corrode.

Amazing Anti-Fog Fluid!

AO 350AF SUPER-CLEAR

Independent field tests prove SUPER-CLEAR keeps plastic and glass surfaces fog-free longer than any solution tested. Cleans and de-fogs in a jiffy — just spray on, wipe off! Non-toxic and non-flammable. Won't deteriorate metal or rubber. Use full strength without dilution. Available in 2-oz. squeeze spray bottle, pint bottles and 1-gallon containers — packed ten 2-oz. bottles per carton.

AO Quality Items like these Help Your Safety Programs Pay Off!

Made Right! **7X211 CHROME LEATHER SPAT**

For operations where "knee to ankle" protection is not required, the 7X211 Spat offers ideal protection. Long 7½″ flare accommodates the largest shoe and can be trimmed to fit the smaller foot. Special rubber compound flare positively eliminates the curling problem — offers complete protection against molten splash. Adjustable quick release straps at ankle plus 2 snap fasteners on elastic webbing make spat easy to put on and take off.

Always insist on AO Trademarked Safety Products

American Optical
COMPANY
SAFETY PRODUCTS DIVISION
SOUTHBRIDGE, MASSACHUSETTS
Safety Service Centers in Principal Cities

YOUR NEAREST AO SAFETY PRODUCTS REPRESENTATIVE CAN SUPPLY YOU

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Around the Country

NEWS REPORTS FROM

Chicago . . . Philadelphia . . . Pittsburgh

Pittsburgh— Foundrymen's sales are being affected adversely by factors beyond their control—vacations in customers' plants and the continuing crisis in steel labor. After picking up steadily since the first of the year, orders started to taper off in late June. Steelmakers decided to postpone their purchases of maintenance and repair items until they could be sure that their operations wouldn't be halted by a strike. Similarly, they delayed ordering presses, ore crushers, and other types of equipment that affect foundry sales indirectly.

If there's no strike, July will be a reasonably good month. Operations at a large steel foundry will average about 65 per cent of capacity. "We've got enough work to keep our present crew busy for two or three months," a sales manager declares. "We look for the year to finish up in pretty good shape."

Railroad equipment suppliers continue to prosper as the carriers replace old cars. One of the larger producers of railroad castings has commitments through the end of the year and the biggest backlog it has enjoyed since early 1957. "We're running full and looking around for more people," a company official reports. "The next six months will be even better than the last six."

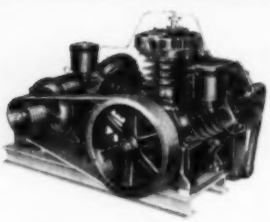
Although they've been hurt by unsettled labor conditions in the steel industry, gray iron foundries still are running two shifts a day, 40 hours a week. Backlogs average about six weeks. Price competition is as stiff as ever, except on specialties. A leading nonferrous foundry fears it soon may have to cut back to a four-day week. Since April, its backlog has dwindled from three months to less than four weeks.

Chicago— The part which the nation's high schools play in creating interest in foundry practice and castings probably isn't recognized widely. Consequently, veteran foundrymen get a lift from reading about a school that is doing an exceptionally good job in acquainting boys with fundamentals of the casting process.

A case in point is Chicago's Lane Technical High School, where a foundry course is part of the shopwork offered to students during

Where the going is TOUGHEST the Curtis keeps going!

Sandiest FOUNDRY conditions haven't stopped this CURTIS AIR COMPRESSOR



The CURTIS C-100 two-stage air-cooled air compressor. 25-30-40 H.P.

- CURTIS-SEAL CRANKCASE
- TIMKEN MAIN BEARINGS
- SELF CENTRO-RING OILING
- AIR COOLED: NO COOL WATER REQUIRED
- PRECISION BUILT

For compressed air—industry depends on *Curtis*. Eliminate production line delays. Get more air faster . . . at lower cost. Where the going is toughest (foundry, factory or shipyard) put the CURTIS C-100 to work and forget it!—Full line of industrial compressors for ordinary and special applications.

For complete information write for illustrated folder.

OUR 105th YEAR

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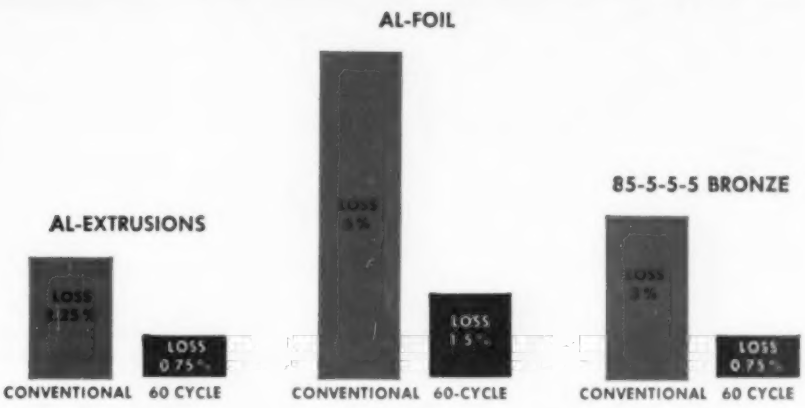
60 CYCLE INDUCTION MELTING *SAVES* Metal and Money

METAL LOSS REDUCED



A sharp cut in metal losses is inherent in 60 CYCLE INDUCTION MELTING. Unnecessary metal losses in a furnace can amount to many thousands of dollars per year. Here are three examples of what AJAX 60 CYCLE INDUCTION furnaces have done for others:

ALUMINUM EXTRUDERS: Typical experience of manufacturers of aluminum extrusion billets using AJAX-TAMA-WYATT 60 CYCLE INDUCTION furnaces is a metal loss of 0.75% as compared to 2.25% in conventional fuel fired furnaces. (Based on a charge containing 30-40% extrusion scrap.)

ALUMINUM FOIL MILLS: 60 CYCLE INDUCTION MELTING furnaces are widely used to melt foil scrap and other finely divided materials. Operating reports show a reduction from 6% metal loss in conventional furnaces to 1 ½ % in the coreless AJAX-JUNKER furnace.

BRASS AND BRONZE FOUNDRIES: AJAX melting furnaces are standard in all brass millcasting shops, because metal losses with other methods are prohibitive. More recently, special AJAX-TAMA-WYATT furnaces have been applied widely to 85-5-5-5 bronze casting. Here the metal loss is under 1%, as compared to 3% or more in externally heated furnaces.

IN ALL THESE CASES, SAVINGS PAID FOR THE EQUIPMENT IN LESS THAN TWO YEARS.

60 CYCLE INDUCTION MELTING has many other important advantages. Our engineers will be glad to analyze your requirements. Please write to AJAX ENGINEERING DIVISION, P. O. Box 1418, Trenton 7, N. J.

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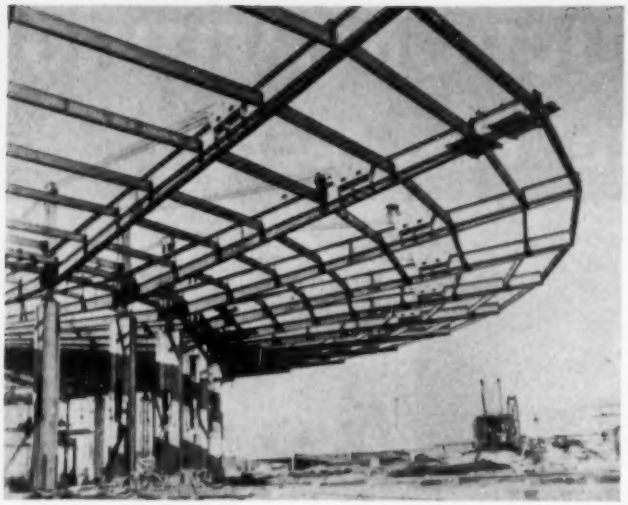

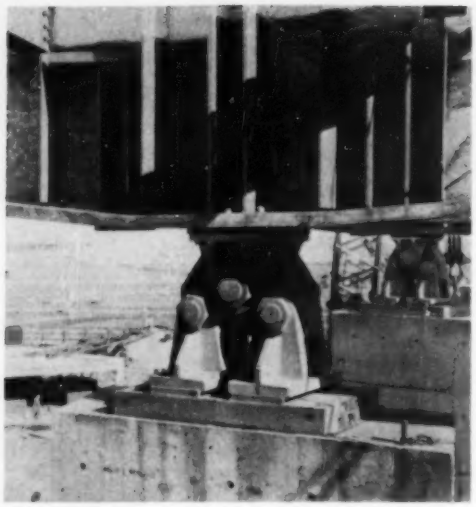

Left, close-up of one of 32 sets of four malleable castings, each set weighing a total of 2660 lb, supporting 4-acre roof of Pan American World Airways terminal. Right, castings used as fulcrums on top of reinforced concrete piers

Malleable Castings Support 4-Acre Roof

● MALLEABLE CASTINGS will support a 4-acre reinforced concrete "umbrella" in hurricane winds at the Pan American World Airways terminal now under construction at New York International Airport.

An elliptical cantilever roof with a major axis of 528 ft and a minor axis of 422 ft covers the terminal building and the area where planes load and unload. The giant canopy is supported by 32 sets of four malleable castings resting on reinforced concrete piers 114 ft in from the edges of the canopy. The castings were manufactured by Lehigh Foundries Co., Easton, Pa., for Lehigh Structural Steel Co., Allentown, Pa.

Believed to be the largest ever produced for this sort of structural use, the four castings in each set total 2660 lb. Two weigh 725 lb each, one weighs 660 lb, and the fourth weighs 550 lb.

Malleable castings were specified because of their strength, uniformity, and economy. They are cast in ASTM grade 35018 ferritic malleable. The castings are as much as $2\frac{1}{2}$ ft long, and section thicknesses range up to 5 x $7\frac{3}{8}$ in. Each casting assembly is 2 ft 11 in. high.

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their first two years. It is an elective, designated a major subject. Students spend 80 minutes in the foundry each day. Lane Tech is not a trade school, however. For instance, every student is required to take four years of English and two years of mathematics.

The following article appeared in the May 13 issue of *The Lane Tech Daily*. Donald Hohl, author of the article, is a co-editor-in-chief of the paper.

LANE'S FOUNDRYMEN POUR IRON

By Don Hohl

Today, May 13, the Lane foundry, under the direction of Mr. Fred Dix, Mr. C. Roland, Mr. L. Sutherland, and Mr. L. Woodruff, climaxed the semester with the pouring of molten iron. This is the high point of the semester's work.

Each student is permitted to prepare a mold, such as an Indian head book-end or a plaque, and then is allowed to finish it, by filing and sanding, in Mr. C. Roland's room. The foundry student is allowed to bring home his finished project. Some of the projects may be painted by the student if he desires.

Mr. L. Sutherland teaches the boys the theory of foundry work. Here they learn the meanings of the terms which are used in foundry. They are taught the names of the tools which are used. They learn gating and risering. They are taught about slicks, rammers, riddles, gaggers, and why it is important to use green and dry sand cores.

When iron castings are produced, the cast iron is melted. The electric furnace can produce iron as liquid. Aluminum castings are also poured. These metals are poured, when melted, into molds of different types.

Making metal castings seems like a very simple operation—given a pattern, a flask, a supply of molding sand, and some molten metal. But a little study develops essential skills in foundry work, which makes for a broad knowledge of a distinct trade.

The Lane foundry department offers an up-to-date course in foundry work as part of Lane's goal to produce men of broad experience and with well-rounded engineering background.

Philadelphia—Following a steady increase throughout the second quarter, casting demand

slumped seasonally in July, with indications of only a mild improvement in August. Mass vacations at both producing and consuming plants and hot weather were the principal retarding factors.

When the lull set in, gray iron foundries were operating at close to 85 per cent of normal capacity, with those in northern New Jersey ranging around 70-75 per cent, although showing some average gain.

Light and medium work has contributed most to the activity at gray iron shops. This demand includes valves and fittings, power transmission components, material handling equipment, miscellaneous construction needs and textile and tobacco processing machinery. Backlogs in these lines in June extended eight weeks at some shops.

But in the heavy lines—automotive dies, turbines, and heavy industrial equipment in general—there has been little gain, with backlogs small.

This lack of heavy work has been reflected particularly in steel castings. In June steel jobbers were operating four to five days a week and with only partial working forces. Output was estimated at 65-70 per cent.

Before the seasonal lull, malleable shops had been doing well for many weeks. Demand had been strong for valves and fittings, pipe hangers, small hardware, and such electrical equipment as brackets and insulator posts. Operations ran five days a week and better and with full working forces. Current lag is regarded as only temporary.

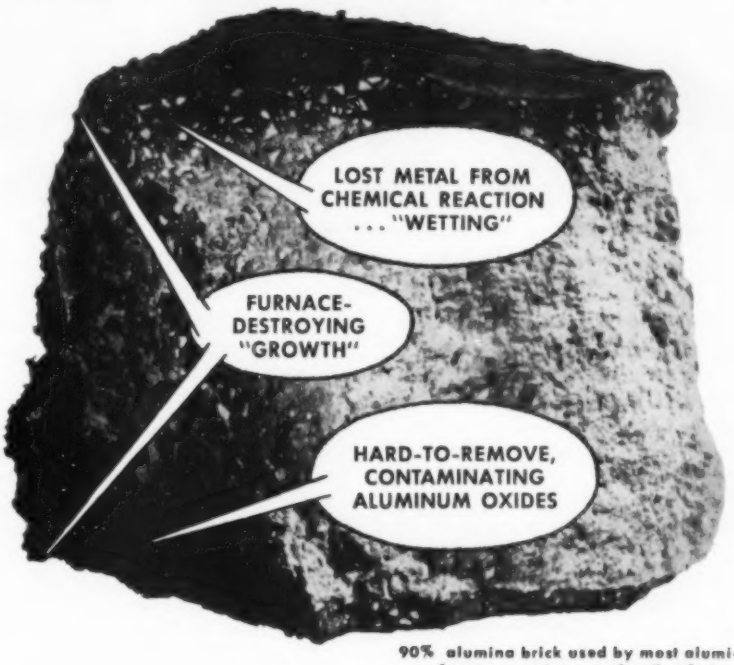
Leading nonferrous job shops had been doing well for some time also. Prior to the vacation season many were up to five days a week operation, this applying to red as well as light metal plants, which latter had been finding the going somewhat easier all along. In most cases, however, foundrymen had to dig hard for tonnage.

Constructs Test Laboratory

Air Reduction Co., New York, plans to construct a test laboratory in Franklin Township, N. J. The new laboratory will be devoted to research on fuels and oxidizers. Facilities will be provided for laboratory, prepilot, and pilot scale operations.

ALUMINUM REMELT FURNACES:

Porter "Multex-85" avoids these refractory problems in lower sidewalls and bottoms . . .



90% alumina brick used by most aluminum furnace operators as a hearth refractory

You've seen the conditions illustrated here, in your own furnaces! These are the typical, costly problems encountered with most refractories for aluminum furnaces! Porter "Multex-85" can virtually eliminate these irritating furnace conditions, *and* give you improved metal quality. "Multex-85" costs less than most aluminum refractories, cuts cleaning costs, results in virtually no metal loss (and is easily and economically removed).

We can show you countless test results that are already a matter of record. But the best comparison is a "Multex-85" lining tried under *your* operating conditions. Installed and operated according to accepted good practices, a "Multex-85" lining will give you better results than your present refractory . . . *a difference you can count in dollars.*

For complete information write: *Mullite Works, Refractories Division, H. K. Porter Company, Inc., Porter Building, Pittsburgh 19, Pa.*

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Men of Industry

E. CLAUDE JETER

ERNEST E. HARKESS

. . . promotions announced by Ford Motor Co.

LANE M. CURRIE

VICTOR L. HENDERSON

. . . Macaulay Foundry promotions

E. Claude Jeter has been promoted to manufacturing manager of foundries in Ford Motor Co.'s Engine and Foundry Div., responsible for the Cleveland foundry, the Dearborn, Mich., iron and specialty foundries, and the Sheffield, Ala., aluminum foundry. He succeeds **Frank X. Bujold** who has been appointed to handle special assignments for **M. L. Katke**, general manager of the division. **Ernest E. Harkess** becomes Cleveland foundry manager, a position Mr. Jeter has held since 1950. Mr. Jeter joined the Highland Park, Mich., plant in 1928 and later transferred to the Rouge plant, where he became manager. Mr. Harkess became technical assistant to the Dearborn foundry manager in 1950 and later that year went to Cleveland as manager of the pattern department. He was named Cleveland production manager in 1955.

W. Basil Leach, formerly president, Mexico Refractories Co., Mexico, Mo., has been named a vice president, Kaiser Aluminum & Chemical Sales Inc., Oakland, Calif., following the recent merger of the two companies. **Charles A. Smith,** executive vice president of Mexico Refractories, has been made a vice president of Kaiser Aluminum & Chemical Corp. They will continue their headquarters at Mexico, Mo.

Samuel S. Johnson and **John R. Puckett** have joined Hamilton Foundry Inc., Hamilton, Ohio. Formerly with American Machine & Foundry Co., Greenwich, Conn., Mr. Johnson has been named assistant superintendent of foundries. Mr. Puckett has been appointed customer service supervisor. He has been with Pollack Paper Corp., and Aeronca Mfg. Corp., both of Middletown, Ohio.

Donald H. Ambrose has been appointed foundry superintendent, Rosedale Foundry & Machine Co., Pittsburgh. With the company since 1947, he was formerly metallurgist and assistant foundry superintendent.

Lane M. Currie, former treasurer, has been named executive vice president and a director, H. C. Macaulay Foundry Co., Berkeley, Calif., succeeding the late Earl Paltenghi.

W. BASIL LEACH

CHARLES A. SMITH

Kaiser Aluminum & Chemical executives

SAMUEL S. JOHNSON

JOHN R. PUCKETT

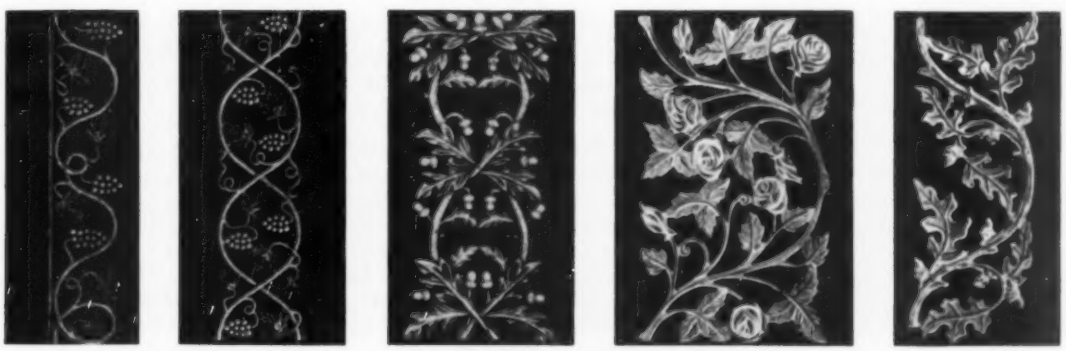
. . . Hamilton Foundry appointments

Beauty and Service of CAST IRON *is Eternal*

Our Company supplies quality pig iron to many customers that manufacture beautiful ornamental designs for home decoration like those pictured here.

These illustrate the versatility of uniform Woodward iron, which has demonstrated its outstanding dependability in the production of quality castings of all types and sizes.

For quotations, write or call our Sales Department, Woodward, Ala.



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609 Bona Allen Building, Atlanta 3, Ga.; 230 North Michigan Avenue, Chicago 1, Ill.; First National Building, P. O. Box 538, Cincinnati 1, Ohio; 1659 Union Commerce Building, Cleveland 14, Ohio; 1203 Ford Bldg., Detroit 26, Mich.; P. O. Box 335, Duluth 1, Minn.; 412 Guaranty Bldg., Indianapolis 4, Ind.; 70 Pine St., New York 5, N. Y.; 1500 Walnut Street Bldg., Philadelphia 2, Pa.; 1910 Clark Bldg., Pittsburgh 22, Pa.; 902 Syndicate Trust Bldg., St. Louis 1, Mo.

WOODWARD IRON COMPANY

WOODWARD, ALABAMA

Independent Since 1882

Circle 646 on Page 85

CLARENCE A. GEHRMAN
. . . foundry equipment sales

RALPH W. BAILEY
. . . assistant general sales mgr.

HARRY C. HOLMES
. . . abrasive products sales

HERMAN H. PANCAKE
. . . administrative v. p.

He previously served in the production and sales departments. **Victor L. Henderson,** former production manager, has been appointed foundry superintendent. With the Macaulay foundry since 1928, Mr. Henderson was in charge of the pattern shop for eight years. Allan Henderson has been added to the sales staff.

Clarence A. Gehrman has joined Risney Foundry Equipment Co., Hales Corners, Wis., as sales representative in Wisconsin and Minnesota. He recently resigned from Sterling National Industries, Milwaukee, formerly the Sterling Wheelbarrow Co., where he had spent 30 years, the last 15 as sales and advertising manager.

Dr. John H. Hollomon, manager of the metallurgy and ceramics research department, Research Laboratory, General Electric Co., Schenectady, N. Y., has been elected a fellow of the American Academy of Arts and Sciences.

Ralph W. Bailey has been named assistant general sales manager, Federated Metals Div., American Smelting & Refining Co., New York, in addition to his position as sales manager of Asarco's continuous-cast products department. He joined the company in 1945.

Edgar I. Gotthold has been named foundry superintendent of the electronics division, Gorham Mfg. Co., Providence, R. I., where facilities are being expanded to include investment and shell casting equipment. Mr. Gotthold has been in charge of the microwave and electronic component foundry, Budd-Stanley Co., Long Island City, N. Y.

Ralph Rennie has been named New England field sales engineer, Casting Engineers Div., Consolidated Foundries & Mfg. Corp., Chicago, with headquarters in South Windsor, Conn. Until recently he was with Allied Precision Products, East Hartford, Conn., representative for Casting Engineers Div.

Harry C. Holmes recently joined Simonds Worden White Co., Dayton, Ohio, as sales representative of grinding wheels and abrasive products in western Illinois and eastern Iowa.

Herman H. Pancake, recently manager of mining and industrial sales, American Car & Foundry Div., ACF Inc., New York, has been named administrative vice president, Irwin-Sensenich Corp., Irwin, Pa., the former Irwin Foundry & Mine Car Co.

E. S. Twining Jr. was appointed vice president-marketing, Air Reduction Sales Co. Div., Air Reduction Co., New York. **G. L. Werly Jr.** has succeeded Mr. Twining as manager, gas department-marketing. He has been assistant manager. Mr. Twining has been with the company 14 years.

Gary Coomber recently joined the sales staff of Cleco Pneumatic Tool Co. of Canada Ltd., Toronto, Ont.,

DR. JOHN H. HOLLOMON
. . . receives AAAS fellowship

RALPH RENNIE
. . . castings sales engineer

E. S. TWINING JR.
. . . Air Reduction v. p.

GARY COOMBER
. . . Canadian sales, Cleco

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SPINCRAFT LADLES

Light, rugged, Spincraft ladles save replacement costs, make every pouring job easier! Available in a vast range of sizes, in stainless steel as well as mild.

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LIGHT IN WEIGHT
LESS FATIGUE!

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SKILL WILL DO IT
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Division 2-0730

Circle 693 on Page 85

after a training period at Cleco Div., Reed Roller Bit Co., Houston, the American affiliate.

Richard C. Meloy, marketing director, Gray Iron Founders' Society, Cleveland, was the winner of the first award to be given annually by the American Marketing Associa-

RICHARD C. MELOY
. . . receives marketing award

tion's Cleveland Chapter. Mr. Meloy's entry, "Helping an Industry Sell Itself," outlined the marketing program of customer surveys, marketing seminars, services, sales training clinics, and customer castings clinics conducted the last two years by the GIFS.

A. J. Heysel, elected chairman of the Western New York Chapter of the AFS for 1959-60, is eastern manager, E. J. Woodison Co., Detroit, with headquarters in Buffalo. He

A. J. HEYSEL
. . . AFS chapter chairman

worked in the chemical laboratories, Pratt & Letchworth Co., Buffalo, and later was foundry superintendent, Lockport Fittings Co., Lockport, N. Y. Later he went to Australia where he installed equipment

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We can now make, and deliver in every shipment, the exact type of "Malleabrasive" shot or grit that will do your particular job best . . . and at lowest cost to you.

With new, precision controlled equipment and specialized techniques "Malleabrasive" is now job-made to meet each individual cleaning condition.

Why settle for make-shift, general purpose abrasives when you can have "Malleabrasive" tailor-made for you? We'll welcome the chance to tell you how you can benefit.

Write us.

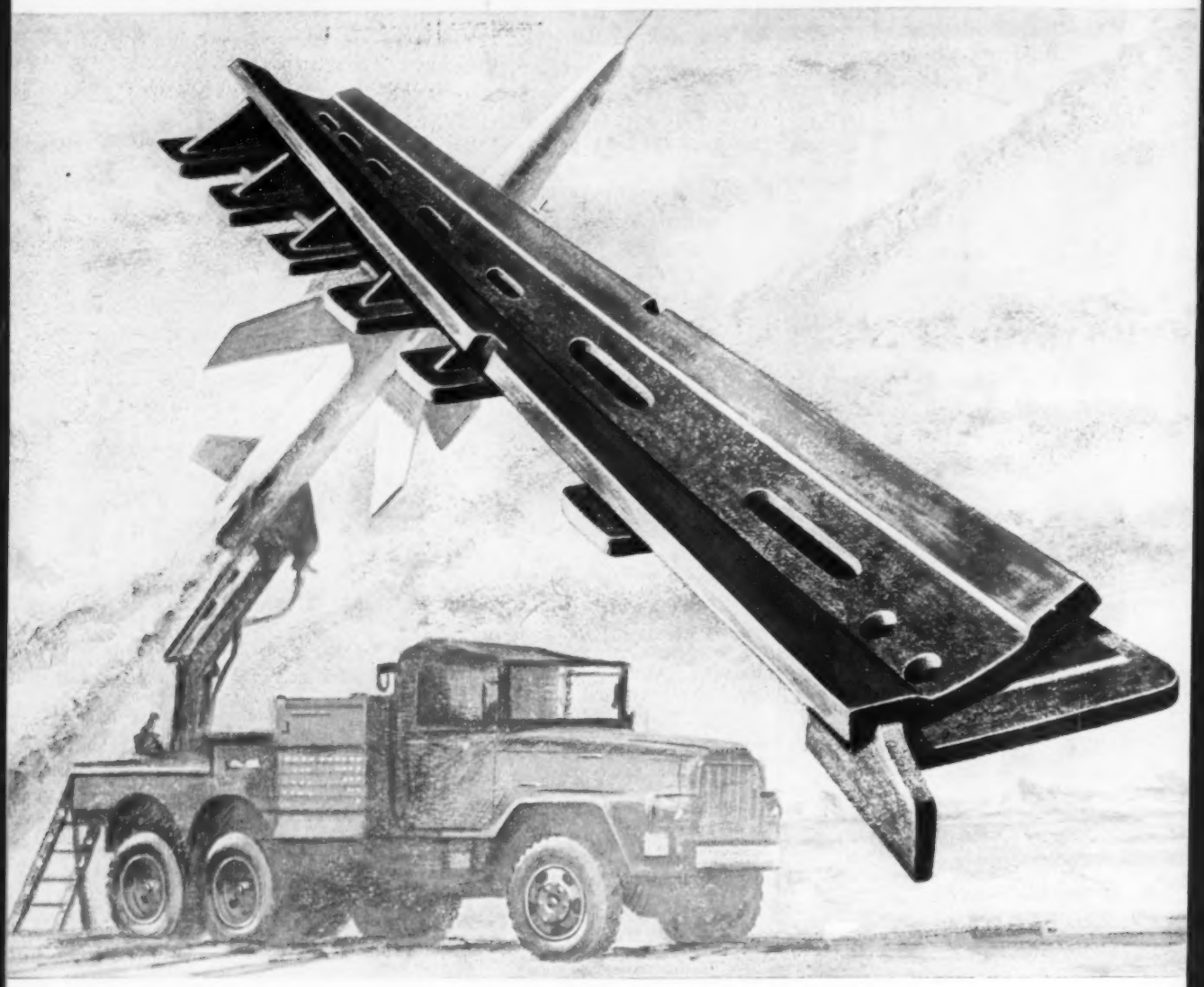
Circle 647 on Page 85

THE GLOBE STEEL ABRASIVE CO.
Mansfield, Ohio

Sold by many leading distributors of foundry supplies from coast to coast.

MALLEABRASIVE

How the Foundry Industry serves America . . . #1 of a Series



IRON CASTING REDUCES COST OF MISSILE LAUNCHER TRACK BY 41%

This important contribution to the guided missile industry was accomplished by replacing the nine independent parts formerly used with one integral high-strength iron casting. Not only was a substantial saving effected, but the cast iron track with its much greater dimensional stability assured the exact alignment so vital to successful missile launching.

This is a typical example of the improved performance at lower cost that can be achieved by incorporating modern iron castings into sound, modern industrial design.

Hanna is proud to be part of this great industry and will continue to provide foundries with all regular grades of pig iron . . . foundry, malleable, Bessemer, intermediate low phosphorus, as well as HANNATITE® and Hanna Silvery . . . in the same high quality and to the same high standards that have made Hanna the best known name in iron.

Facts from files of Gray Iron Founders Society

HANNA
THE BEST KNOWN NAME IN IRON

THE HANNA FURNACE CORPORATION
Buffalo • Detroit • New York • Philadelphia
Merchant Pig Iron Division of
NATIONAL STEEL CORPORATION

Circle 648 on Page 85

S. J. SYNNOTT

R. B. PARK

Manhattan Rubber Div. appointments

for the production of malleable iron. In 1937 he was granted a leave of absence from Woodison Co. to represent Whiting Corp., Harvey, Ill., on Italian installations. Previously Mr. Heysel was New York and Pennsylvania representative of the Woodison Co., and manager of the Buffalo branch. He was vice chairman of Western New York Chapter last year.

R. B. Park has been appointed assistant sales manager for industrial rubber products and packings, Manhattan Rubber Div., Raybestos-Manhattan Inc., Passaic, N. J. **S. J. Synnott** has been named general marketing manager of industrial rubber products. Appointments in a new marketing group of the sales division include: **H. J. Seeley**, marketing manager for Poly-V drives and flat transmission belts; **A. Arguedas**, conveyor and elevator belts; **J. J. Connors**, rubber covered rolls. **G. E. Horvath** has been made marketing manager of mechanical packings. **R. E. Stiles** has succeeded Mr. Park as San Francisco district manager. **N. L. Rush**, formerly manager of distributor sales in the Philadelphia district, has been appointed Minneapolis district manager.

Harold J. Roast and **Eugene H. Weak** have been named special service associates, Westover Corp. & Associates, Milwaukee. Mr. Roast was president-general manager, National Bronze Co., Montreal, and its metallurgical director until 1933 when he became technical adviser, Canadian Bronze Co., Montreal. When he retired in 1947 he continued as consultant to Canadian Bronze and established his own business as bronze foundry consultant in Canada. He is a former vice chairman of the Canadian Section of the American Foundrymen's Society, and was a director of the AFS national organization which made him an honorary life member in 1946 for his contributions to literature and enterprise of the foundry industry in United States and Canada.

EUGENE H. WEAK

HAROLD J. ROAST

. . . become Westover Corp. associates

In the interest of the American foundry industry, this ad (see opposite page) will also appear in

Steel
Iron Age
Foundry
American Metal Market

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If you would like to have reprints of this ad to mail to your customers and prospects, let us know. Reprints will have no Hanna product message or signature, but will be imprinted with your firm name and address. Absolutely no obligation. To order your reprints, fill in and mail the coupon below.

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Detroit 29, Michigan

Please send me_____ reprints of Ad No.
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_____ of your Foundry Industry Series.
Imprint as follows:

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Send reprints to:

NAME _____

I understand there is no charge for this service.

Circle 648 on Page 85

YOU SAVE $$$ because this plastic STAYS MOIST 2 YEARS

PALLETIZED FOR EASY HANDLING

IT'S ALWAYS SAFE to save money by ordering **Ironton NOJOINT** in 550 pound drums because this plastic refractory stays moist and usable for **TWO YEARS!**

SAVE THREE WAYS WITH NOJOINT IN DRUMS

1. No loss from drying out. Tight lid keeps **NOJOINT** always ready for day-to-day jobs.
2. Skip the warehouse charges, purchase larger quantities direct from Ironton.
3. Freight cost per ton is lower on single large shipment than on small re-orders.

WHEREVER HOT METAL RUNS in your foundry, use **NOJOINT.** Best for lining ladles, cupola spouts, tapholes, slag holes . . . and for patching the cupola well.

OTHER CONVENIENT PACKAGES OF NOJOINT

- 100 lb. cartons MOIST in slices 2" thick.
- 100 lb. bags, DRY. Mix with moisture content and other additions as you prefer.

Ironton engineers will visit your foundry and show your men how to use **Ironton NOJOINT** and where. Write or call today for the latest bulletin and additional information.

SINCE 1917 THE IRONTON FIRE BRICK COMPANY IRONTON, OHIO

1315 Ashtabula Street

Write or call Ironton collect for name of nearest representative.

Circle 649 on Page 85

Mr. Weak has had over 40 years of experience in the production of steel and alloys. In 1956 he retired as electric furnace superintendent at the Indiana Harbor Works, American Steel Foundries, East Chicago, Ind., and became a consultant on electric furnace practice in Highland, Ind. Previously he was with Allis-Chalmers Mfg. Co., Cincinnati, and Alloy Cast Steel Co., Marion, Ohio.

A. W. Baker, formerly comptroller-treasurer, Chicago Hardware Foundry Co., North Chicago, Ill.,

A. W. BAKER
. . . Chicago Hardware mgr.

has been appointed general manager in charge of all divisions. He joined the company in 1926.

William G. Blessing, formerly purchasing agent for the Foundry & Mill Machinery Group, Blaw-Knox Co., Pittsburgh, has been named director of purchases for the company. **Bernard R. Lauer** and **Wayne Rawley Jr.,** staff purchasing agents, have been named assistant directors of purchases. Purchasing of the Aetna-Standard Div. has been consolidated into the Foundry & Mill Machinery Group with **Cal R. Wood** as purchasing agent. He has been purchasing agent for Aetna-Standard.

Robert W. Kerr has been elected president, Fairbanks, Morse & Co., Chicago, succeeding **Robert H. Morse Jr.,** who was named vice chairman. Mr. Kerr is also vice president in charge of subsidiary operations for Fairbanks Whitney.

Michael Gladstone has been appointed director of customer relations, Mercast Corp., Los Angeles,

In Milwaukee, The Vilter Manufacturing Company uses . . .

3/4 inch of BERLITE to line 2600 lb. ladles

BERLITE-lined 2600 pound ladle

IRONTON BERLITE is "insurance" for the Vilter foundry where VILTRITE castings have to be right the FIRST TIME. The superintendent there specifies BERLITE for lining ladles because his long experience shows consistently...absolutely

- NO EROSION
- FORMS NO SLAG
- NO METAL STICKS TO BERLITE LINING

(any skull that forms in ladle is easily knocked out without harm to the lining)

All the facts on this BERLITE application are available from Ironton. If you want to test Ironton BERLITE in a ladle, let us know. We will show you what a RELIABLE REFRACTORY can do!

SINCE 1917 THE IRONTON FIRE BRICK COMPANY IRONTON, OHIO

1315 Ashtabula Street

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Circle 650 on Page 85

and its casting subsidiary in LaVerne, Calif. He has been with the company four years and formerly was vice president and general sales manager of one of its subsidiaries.

James W. Thornhill III, graduated recently from Case Institute of Technology, Cleveland, on a Found-

JAMES W. THORNHILL III
. . . joins Fulton Foundry

ry Educational Foundation scholarship, has joined Fulton Foundry & Machine Co., Cleveland.

L. A. Dunn has been named general manager, Buck Iron Co., Quarryville, Pa. Mr. Dunn man-

L. A. DUNN
. . . joins Buck Iron Co.

aged General Electric Co.'s foundries in Erie, Pa., for 25 years and last year was foundry manager of Acinfer, S. A., a large gray and malleable iron foundry in Argentina.

John M. Dugan was recently named vice president-operations, Lima Div., Ohio Steel Foundry Co., Lima, Ohio. With the company 20 years, he was formerly works manager and chief metallurgist of the Lima plant.

There's a big difference in

PAYLOADER® Performance

BIG LOAD CAPACITY—The model H-25 PAYLOADER tractor-shovel has a carry capacity of 2,500 lbs.—carries more for its weight than any machine in its class.

MORE DIGGING POWER — Breakout force of 4,500 lbs. is available at the bucket cutting edge — more than on any other machine in its class. Exclusive power-transfer differential makes traction and "crowding" power more positive, especially in slippery conditions.

MORE MANEUVERABLE — Shortest turning radius (only 6 ft. at rear wheel hub) and power-steer make it possible to operate in closer quarters with greater speed and safety.

POWER-SHIFT TRANSMISSION — The model H-25 is the only machine in its class having a full-reversing power-shift transmission with two speed ranges forward *and* reverse — the low ranges for digging and close maneuvering, the high ranges for fast, economical travel. No "clutching" or gear-shifting.

LOWER MAINTENANCE — The boom and bucket mechanism is of rugged, simple design with fewer parts and linkages. Quality materials are used throughout, including anti-friction bearings at critical pivots.

LONGER LIFE — The most complete system of protection has been engineered into the Model H-25 to insure long life and freedom from trouble: triple air cleaning system for the engine; cartridge type filters for all three oil systems; self-adjusting, sealed hydraulic brakes; closed pressure-controlled hydraulic system; grease and oil seals on all vital pivots.

Your Hough Distributor is another reason why you'll get lower-cost bulk material handling from a PAYLOADER. He is ready to give you full information on the H-25, or larger models up to 12,000 lb. carry capacity.

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8-A-2

Name
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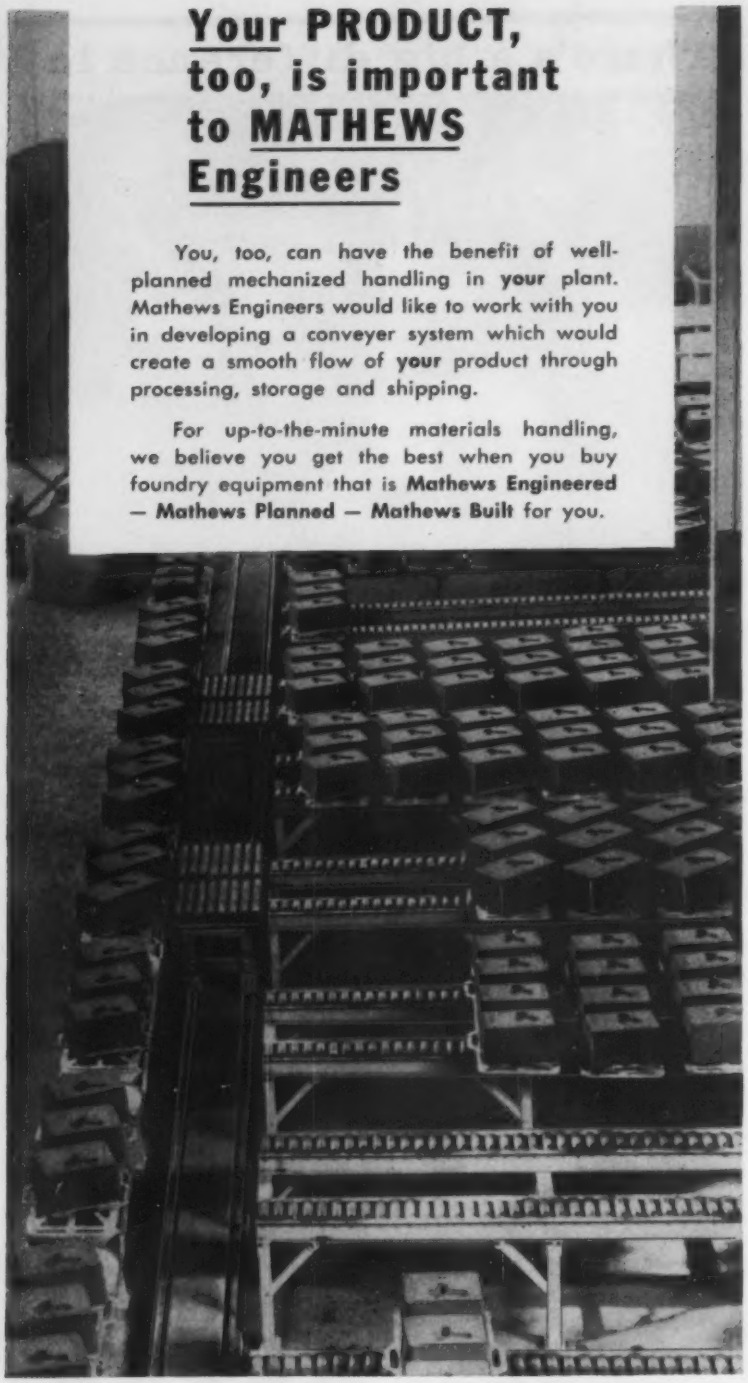
Company
Address
City State

Circle 651 on Page 85



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You, too, can have the benefit of well-planned mechanized handling in **your** plant. Mathews Engineers would like to work with you in developing a conveyer system which would create a smooth flow of **your** product through processing, storage and shipping.

For up-to-the-minute materials handling, we believe you get the best when you buy foundry equipment that is **Mathews Engineered — Mathews Planned — Mathews Built** for you.

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CANADIAN DIVISION . MATHEWS CONVEYER COMPANY, LTD., PORT HOPE, ONTARIO.

MATHEWS

(Member Foundry Equipment Manufacturers Association)

Missouri Valley Conference To Be Held Sept. 24-25

The 1959 Missouri Valley Regional Conference of the American Foundrymen's Society at Rolla, Mo., Thursday and Friday, Sept. 24-25, will feature a program of practical foundry know-how.

William W. Maloney, general manager of the AFS, will discuss the Training and Research Institute and new society developments. Howard A. Williams, Eaton Mfg. Co., Cleveland, will follow Mr. Maloney in an outline of what customers expect from foundries.

Thursday afternoon and Friday will be devoted to technical subjects.

Program details follow:

Thursday, Sept. 24

8 a.m.—Registration

10 a.m.—**Conference Opening:** Dan A. Mitchell, Progressive Brass Mfg. Co., Tulsa, Okla., conference chairman, presiding.

10:15 a.m.—**Address of Welcome:** Dean Curtis L. Wilson, Missouri School of Mines and Metallurgy. Response from Nat'onal Office, Webb L. Kummerer, president, Midvale Mining & Mfg. Co., St. Louis, regional vice president, AFS.

10:30 a.m.—**General Session:** "Facts about the Training and Research Institute and News on AFS Developments," William W. Maloney, general manager, AFS. "What the Customer Expects from Foundries," Howard A. Williams, Eaton Mfg. Co., Cleveland.

12:15 p.m.—Luncheon: "The Engineer Meets His Foreign Friends." A. Carl Weber, Laclede Steel Co., St. Louis.

2 p.m.—**Sectional Meetings:**
Steel: **Cast Steel—The 'Last Word' in Engineering Material,** Jules Henry, Missouri Steel Castings Co., Joplin, Mo. **Dielectric Core Baking,** Mitchell B. Milonski, American Steel Foundries, Granite City, Ill.
Gray Iron: **Fundamentals of Cast Iron Metallurgy,** William H. Moore, Meehanite Metal Corp., New Rochelle, N. Y. **Sand Practice in the Iron Foundry,** Joseph Schumacher, Hill & Griffith Co., Cincinnati.
Nonferrous: **Melting and Fluxing of Nonferrous Metal,** Harry Ahl, Malleable Iron Fittings Co., Branford, Conn., **Aluminum Castings—Defects and Their Corrections,** D. L. LaVelle, American Smelting & Refining Co., South Plainfield, N. J.

5:30 p.m.—**Ozark Jamboree and Barbecue,** Forest Springs Lodge, Newburg, Mo.

Friday, Sept. 25

9 a.m.—**Sectional Meetings:**
Steel: **Can a Market Be Produced?** George K. Dreher, Steel Founders' Society of America, Cleveland. **Can Bentonite Be Evaluated?** Arthur Zrimsek, Magnet Cove Barium Corp., Des Plaines, Ill.
Gray Iron: **Gating and Risering of Iron Castings,** Charles Walton, Gray Iron Founders' Society. **Fundamentals of Cupola Practice,** Walter R. Jaeschke, Whiting Corp., Harvey, Ill.
Nonferrous: **Melting and Casting of Aluminum Bronzes,** J. D. Dick, Montreal Bronze Ltd., Montreal. **Permanent Molding—Static and Centrifugal,** N. A. Birch, National Bearing Div., American Brake Shoe Co., St. Louis.

12:15—**Luncheon: The Roar of the Crowd,** Harry H. Kessler, Sorbo-Mat Process Engineers and Foundry Design Co., St. Louis.

2 p.m.— **Sectional Meet'ngs:**
Steel: **Material Handling and Maintenance at General Steel Castings,** Vernon Lich, General Steel Castings Corp., Granite City, Ill. **What Is a Cereal Binder?,** C. F. Lourich, Corn Products Sales Co., Chicago.
Gray Iron: **Cold Setting Cores for Iron Castings,** Daniel R. Chester, Archer-Daniels-Midland Co., Cleveland. **Shell Cores for Iron Castings,** Earl W. Jahn, Shell Process Inc., West Springfield, Mass.
Nonferrous: **Nonferrous Castings — Defects and Corrections,** Ray Cochran, R. Lavin & Sons Inc., Chicago. **Almost Every Foundry Can Have Improved Sands,** E. E. Woodliff, Foundry Sand Service Engineering Co., Detroit.

4:30 p.m.—Conference Adjournment.

Circle 652 on Page 85

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longer
without
ladle
distortion

Industrial
TYPE 592 ICT

HOLDS METAL ALMOST 3 TIMES AS LONG as is possible in open ladles. Delivers accurate performance even after a full day of heavy production pouring with no cooling time. No binding from heat distortion of ladle bowl. Cuts costs on operations of every size.

Outline your pouring requirements for us. Ask for the latest catalog on our complete line of standard and custom pouring and handling equipment.

Industrial
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115 OHIO ST., MINSTER, OHIO

Circle 653 on Page 85

Obituary

Dr. James E. Hurst, 65, deputy chairman and managing director, Bradley & Foster Ltd., Darlaston, England, until his retirement last year, died June 21, after a long illness. Following service with various companies as a metallurgist, he became technical adviser to Bradley & Foster in 1926, technical director in 1934, managing director in 1949, and deputy chairman in 1952. He was a past president of the Institute of British Foundrymen and the British Cast Iron Research Association.

Dr. Hurst was well known to American foundrymen, having visited the United States on numerous occasions. He was the author of many papers and articles and of two books, *Melting of Cast Iron* and *Melting Iron in the Cupola.* The latter ran as a series of articles in FOUNDRY in 1928-29 before it was published in book form by the Penton Publishing Co. In recognition of his outstanding contributions to the melting of cast iron, Dr. Hurst was awarded the Oliver Stubbs Gold Medal by the IBF.

Glen E. Cramer, 58, since 1947 assistant professor of general engineering, Navy Pier Branch, University of Illinois, died July 5. Before he joined the university he was superintendent of the alloy foundry, American Manganese Steel Div., American Brake Shoe Co., Chicago Hgts., Ill.

Ronald F. Webster, 68, for many years with the former Hydro-Blast Corp., Chicago, died June 21. Prior to retirement in 1953 because of ill health, and before the company became a division of American Marietta Co., Chicago, Mr. Webster was sales manager, secretary, consultant, and general manager of Hydro-Blast.

William B. Neal, 73, vice president and district sales manager, Attalla Pipe & Foundry Co., Attalla, Ala., died June 28 in Oak Park, Ill.

Raymond E. Lawrence, president, Bay State Bronze & Aluminum Co., East Longmeadow, Mass., died May 23.

NARCA 70 B

THE ONE MODERN HIGH ALUMINA PLASTIC REFRACTORY
for ALL your requirements!

- Electric Furnace Roofs or Center Sections
- Crucible Furnaces
- Runners
- Spouts
- Ladles (all types)

JOINTLESS CONSTRUCTION
EASE OF INSTALLATION
LONG-LASTING SERVICE

Furnished in
- 100 lb. Easy-to-Handle Cartons
- Conveniently Sized 2" Slices
- Air or Hand Ram Consistency
- Polyethylene Envelopes for Safe Storage

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Circle 654 on Page 85

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CO_2 EQUIPMENT • BINDERS • FACINGS • SANDS •
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Manufacturers of KORWELD COREPASTE & MASTERMIX WASHES
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Professors of Foundrydom
Circle 655 on Page 85

The Sandman Says

By HAROLD E. HENDERSON
H. C. Macaulay Foundry Co.
Berkeley, Calif.

"The Fault Finder"

● CONTRARY to an opinion widely held among foundry foremen and others, a casting inspector is not necessarily the devil's assistant.

It is not his appointed task to irritate and exasperate the core and molding departments beyond the limits of human endurance. This much maligned individual is endeavoring to do his job in an efficient manner. His judgment in rejecting castings sometimes is open to question, however, and frequently results in strained relations between him and the foundry foreman.

The appointment of a full-time casting inspector by and for the jobbing foundry is an innovation of recent years. It cannot as yet be considered general practice. The economic importance of the post still is a moot question. This inspector's work previously was—and in most shops still is—considered the province of the staff of the cleaning department. But in this age of specialization it is becoming a one-man job.

The Fault Finder—Fault finders are likely to be unpopular in any society, and the casting inspector very definitely is a fault finder. He takes pride in the cultivation and exercise of this talent. In the foundry detection of flaws that might reject a casting, he assertedly saves the cost of futile machining and two-way cartage.

This saving may or may not justify the salary he receives. Most of the castings he discards would be thrown out anyway by the working staff. Other defects are too deeply concealed even for his practiced eye and hammer, and are revealed only after expensive machining.

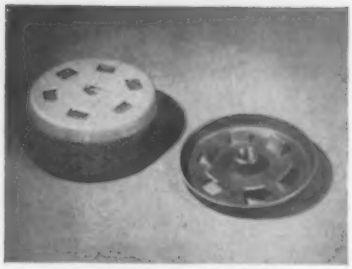
His usefulness is confined then to the detection of borderline flaws which the normal foundry eye fails to observe. Needless to say, he becomes most expert at this task, to the frequent consternation of those who must produce castings under conditions that leave much to be desired.

Hypercritical inspection is almost as bad as no inspection. If a defect, surface or otherwise, in no way affects or diminishes the end use of the casting, that casting should not be rejected merely to satisfy an overzealous inspector.

Where a high degree of precision is essential to performance, as in a watch or a micrometer, no one will argue against rigid inspection. Where human health or even life itself may depend on precise control of means or methods, inspection of the highest order should be mandatory. No one denies this. But to use the wrong yardstick in condemning castings is like burning down a house to get a mouse in the cellar.

No foundryman of my acquaintance would sell a bad casting deliberately. If he were totally devoid of pride or ethics, he at least would be impelled by a guiding business sense. He knows that his

THE LITTLE NORTON WHEELS go a long way!



...last longer, save more, on all portable snagging jobs

Built-In Reinforcement is an available feature of Norton cup wheels in standard size 6/4¾ x 2" (ME 71249). The new steel cup bushing, molded firmly into the wheel back, provides added safety.

Your operators like the difference when they put Norton portable snagging wheels to work. You'll like it, too, when you add up your costs. Thanks to their built-in balance and uniform structure, Norton portable wheels *hug that work* with less vibration, less bounce — and they pay off with faster grinding, longer wheel life and less operator fatigue.

In the 100% complete Norton line you'll find wheels in the right sizes, shapes and abrasive-bond combination for snagging all metals. For example:

- *Wheels of 44* ALUNDUM* *abrasive and the B11 bond are best for snagging steel. "44," although non-premium priced, is tougher and harder than other aluminum oxide abrasives. And the B11 resinoid bond enables precise duplication in half-grade increments of hardness, across the entire hardness scale.*
- *For gray iron and non-ferrous metals, use* CRYSTOLON* *abrasive K bond wheels — an unequalled combination of silicon carbide abrasive and vitrified bond for slow speed snagging.*

See how you can snag off more metal per dollar with Norton wheels. See your Norton Distributor or write to NORTON COMPANY, General Offices, Worcester 6, Mass. Plants and distributors around the world.

*Trade-Marks Reg. U.S. Pat. Off. and Foreign Countries

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Making better products . . . to make your products better

NORTON PRODUCTS: Abrasives • Grinding Wheels • Grinding Machines • Refractories • Electro-Chemicals — **BEHR-MANNING DIVISION:** Coated Abrasives • Sharpening Stones • Pressure-Sensitive Tapes

Reduce cleaning costs by improving "as cast" finish with Foseco

MOLDCOTE

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TERRACOTE

coatings for molds and cores

This bulletin tells you how. Send for your free copy today.

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P. O. Box 8720, Cleveland 35, Ohio

Circle 657 on Page 85

customers have a habit of talking to each other, and a cheating foundryman soon would find his reputation damaged beyond repair.

Quality Variations—Within definable limits, casting inspection is laudable, but the limits demand recognition. A great deal has been said and written about quality control, but that which constitutes quality in one casting would have no value whatever in another.

Why should a casting be rejected because of surface blemishes if appearance in no way affects the end use of the part in question? Why should a customer be forced to pay for service and adherence to specifications that do not enhance the value of his castings or finished product? Quality is usually reflected in price, and when casting specifications become too stringent, the cost is likely to be prohibitive, and our casting buyer will turn to other methods and materials.

I am not suggesting that standards be lowered, nor that sensible inspection be eliminated, but rather that standards and inspection be aimed at ultimate values.

Many foundrymen purposely have avoided government contracts, fearing politically appointed inspectors who could and would ruthlessly condemn a serviceable casting. During World War I (prior to American entry), I was working in a malleable shop in Sydney, Australia, molding toe and heel clips for soldier's boots. We had an order for 2 million of these, and each molder produced about 2000 per day.

A full-time government inspector sat in the cleaning room, meticulously checking each casting with a micrometer. A ridiculously microscopic plus or minus reading sent a good casting to the scrap pile. As a matter of fact, however, the poorest of those rejected clips would have outworn the strongest boot that ever covered a soldier's foot. Fully 90 per cent of the rejections were unwarranted in the eyes of any man with an iota of intelligence. I was not surprised to hear my boss insist that he never would touch another government contract.

Who's Perfect?—Perfection is an unattainable goal, in castings or anything else. A casting inspector, whether he be employed by the foundry or the machine shop, supposedly services the best interest of the firm which employs him.

If in knowledge and judgment he is fully qualified, his work should be above reproach. If he is lacking in these qualities, he can do an inestimable amount of damage. To reject an otherwise good casting because of minor imperfections is to increase the cost of doing business for all concerned. It also plays havoc with foundry morale.

If the cleaning room staff does not have time or is incapable of adequate inspection, and a specialist must be employed, why trust the core and mold mechanics or their foremen? Perhaps we need core and mold inspectors more than we do casting inspectors. When we arrive at the ultimate, we'll have inspectors inspecting the inspectors.

Gold is for the mistress—silver
for the maid—
Copper for the craftsman cunning at his trade.
Good said the Baron, sitting in
his hall,

Haul Castings the Economical Sterling Way!

These all-steel, heavy duty trucks come in handy for hauling castings to and from cleaning room. With roller bearing wheels and ball bearing swivel casters, they glide along smoothly, maneuver easily. Save both time and labor. Capacity 2,000 lbs. Sturdy, reinforced welded construction. Write for literature.

STERLING NATIONAL INDUSTRIES, Inc., Milwaukee 14, Wis., U. S. A.
Founded 1904 as Sterling Wheelbarrow Company

Sterling

FOUNDRY EQUIPMENT

A-8530-½R

Circle 658 on Page 85

But iron—cold iron—is master of them all.

—Rudyard Kipling

I am indebted to O. Jay Myers of Reichhold Chemicals for sending me this Kipling tribute to iron. I'm sure that any man should be permitted — even encouraged — to sing the praises of his craft or of the basic material with which he works. We've all heard of "deathless bronze" and "imperishable marble"—or is it the other way around? Books have been written extolling the virtues of wood, stone, metals, sand, clay, and the innunerable other gifts of nature.

So Kipling is on safe ground when he champions iron. Without it, we'd have little else mechanically. This metal won wars a thousand years B. C. and has increased in usefulness ever since. Its values, known and potential, still excite the industrial imagination of man.

Regional Shows Planned by Material Handling Institute

Regional exhibits of material handling equipment are planned for the next two years by the Material Handling Institute. In the past the institute has held national trade shows every three years, the latest one in Cleveland, June 8-12.

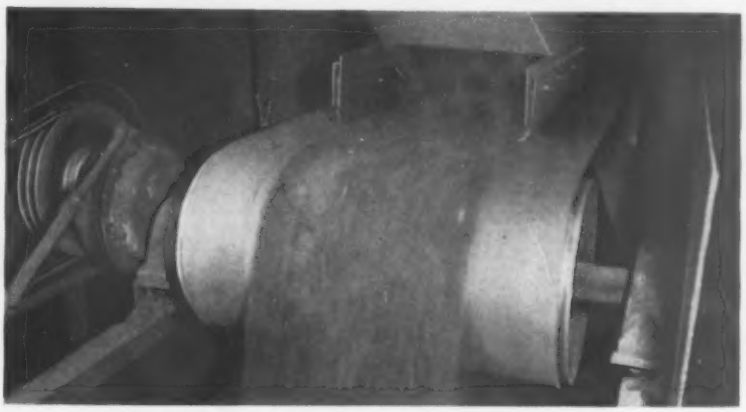
First of the regional shows will be in the Commonwealth Armory, Boston, next June 6-8. The institute's Central States Show is scheduled for the Kentucky Fair and Exposition Center, Louisville, Nov. 8-10, 1960. A Pacific Coast Show will be held in San Francisco's Cow Palace on Feb. 22-24, 1961, and an Eastern States Show is planned for the Philadelphia Convention Hall on May 9-11, 1961.

The institute will not make a decision regarding future national expositions until experience is gained from the regional show program. The regional program, it is felt, will provide exhibitors maximum customer audiences and reduce travel costs of equipment buyers.

Technical and educational sessions accompanying the regional shows will be handled by the American Material Handling Society. The program also has been endorsed by the Material Handling Equipment Distributors Association.

"STEARNS MAGNET PULLEY SAVES US $3,000 PER YEAR"

Says Foundry Superintendent



Here the Stearns Series 410 20x24 pulley, mounted in a pulley separator unit, removes tramp iron from foundry sand at Falls Foundry, Menomonee Falls, Wisconsin.

"No more damage to patterns"
"No more injury to workers' hands"

Falls Foundry, Menomonee Falls, Wisconsin, installed a new Stearns INDOX V permanent magnet pulley about a year ago. A. E. Lapp, foundry superintendent, states: "This Stearns unit is doing an outstanding job. We run about 125 tons of sand over the pulley every day, and pull out about a half to three-fourths of a ton of iron a day. Before we put this magnetic pulley in, we reclaimed the sand by means of a sand cutter and brush system. The first time we used the pulley, we pulled out about 6 tons of iron."

Saves patterns, workers' hands

Mr. Lapp estimated that before installing the pulley, the company had about $150 per month in pattern damage. This was due to chunks of iron that were left in the sand. Since putting in the Stearns pulley, they have not had a single bit of pattern damage. The same thing with injuries. Before the pulley, workers were constantly hurting hands and fingers on sharp iron bits. Now there are no cases of hand injury while working in the sand. Mr. Lapp further states: "We used to pay a salvage outfit $5 a ton of scrap metal to salvage it. Taking this saving along with our pattern saving, we're ahead about $3,000 a year. You couldn't take this pulley away from me."

No Electrical Cost

Find out how a new INDOX V magnet pulley can save you money. No electric cost — no maintenance cost — tremendous magnetic pulling power. Nothing matches this new INDOX V material. A Stearns representative can give you facts and figures. Write us today for nearest representative and new free literature. Specify Bulletin 1021G.

STEARNS MAGNETIC PRODUCTS

A DIVISION OF THE INDIANA STEEL PRODUCTS COMPANY

635 SOUTH 28TH STREET • MILWAUKEE 46, WISCONSIN

Circle 659 on Page 85

The president thanks the meeting following his election. Shown here are, left to right, C. H. Wilson, president; A. E. Peace, past president; G. Lambert, secretary; G. R. Shotton, vice president; and N. P. Newman, treasurer

Institute of British Foundrymen

Holds 56th Annual Conference

By M. M. HALLETT
Managing Director
Chamberlin & Hill Ltd., Walsall, England
European Editor, Foundry

● THE INSTITUTE of British Foundrymen held its 56th annual conference June 10-13 at Scarborough. At the opening general meeting Treasurer N. P. Newman presented the financial accounts, showing a healthy state of affairs. M. M. Hallett presented the Technical Council reports. This highlighted co-operation between various interests in the foundry industry so that the maximum amount of value could be obtained from the researches sponsored by the institute.

Some of the newer work under direction of subcommittees involves the testing of materials used in the CO_2 Process, the surface finish of iron castings made by that process, and the flow of metals in gating systems.

Metal Awards—The E. J. Fox Medal was presented to Dr. C. J. Dadswell, past president, in recognition of his exceptional services to the institute and the industry. The Meritorious Services Medal was awarded to Ben Hird in recognition of his outstanding work for the institute over a period of 46 year's membership. The British Foundry Medal was awarded to T. C. Wilson, and the British Foundry Prize to J. B. Hollis, co-authors of a paper on mold and core production by the CO_2 Process at the Blakeborough Foundries.

Sir Frederick Scopes, past president of the Joint Iron Council and of the British Cast Iron Research Association and chairman of the board of governors of the National Foundry College was elected to honorary membership in the institute. Diplomas for papers presented during the past year were awarded to J. H. Osborn, T. A. Marsden, R. F. Horton, H. G. C. King, and G. C. B. Lamb.

Officers Elected—Charles H. Wilson was elected president, G. R. Shotton was promoted from junior vice president to senior vice president, and D. A. Richards was elected junior vice president. Mr. Richards is a past chairman of the Bristol and West of England Branch and a past member of the National Council. His election indicates that the 1961 conference will be held in the West of England.

A special resolution was passed amending the bylaws to stiffen-up the conditions for the entry of members into the institute with the broad aim of increasing the institute's status. Five members, H. T. Angus, R. L. Handley, B. Hooper, A. Kirkham, and H. P. Millar, were elected to Council.

In his presidential address Mr. Wilson remarked that he was the first president whose father also had been president and was also the first president to hold the diploma of the British Foundry School which had now developed into the National Foundry College. He reviewed the institute's progress during the twelve years since his father's tenure of office.

In this period the membership had increased from 3,900 to 6,330. A number of new branches and sections had been established at several places in England and in the Dominions and many other activities

WHO'S GOT HANDLEBAR HARRY?

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had progressed normally, one notable feature being the establishment of the institute's publication *The British Foundryman*. Mr. Wilson pointed to progress in training and education, and, after referring to changes which were impending at the National Foundry College, referred particularly to craft training. He felt that, while much had been done, much remained to do.

Williams Lecture — The annual Edward Williams Memorial Lecture was delivered by Sir Frederick Scopes. His subject was "Thoughts on the Future of the Ironfounding Industry." Statistical data showed progress of the industry during past years with some deductions on what might happen in the future. It was suggested that iron castings production of the UK in the year 2000 might be three times that in 1953. This would compare with an increase of nearly five times in general industrial production.

Particular attention was paid to the importance of cheap fuel in the iron-founding industry and to economics in the use of coal. Efforts to reduce the cost of castings production also were discussed.

Technical Sessions — The first paper was the French exchange paper by Morris Grandpierre on application of ductile cast iron in the field of pipe lines. In addition to pipe, examples were given of the use of ductile cast iron in oil tankers.

During discussion it was mentioned that the material from the basic Bessemer converter could be recarburized in another converter by rocking and blowing gently over a bed of red-hot coke. Low frequency induction furnaces could be used for super-heating the metal from the mixers. The speaker's statement that phosphorus interfered with the production of S. G. iron was contested. Spheroids could be formed satisfactorily even in the presence of 1 per cent phosphorus but the metal would be brittle.

Discussion also revealed that no difficulty had been experienced with diminution of the effect of the magnesium addition on standing in the ladle because the metal never was held more than seven to ten minutes owing to a desire to maintain a high temperature. Welding of ductile iron was not considered as a satisfactory and reliable procedure in the present state of knowledge.

CHARLES H. WILSON
President

G. R. SHOTTON
Senior Vice President

D. A. RICHARDS
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A paper by E. Morgan and H. H. M. Milnes dealt with the manufacture of spun soil and rainwater pipe. In a pipe-casting machine described in the paper, preheated and precoated metal molds are fed to a spinning station, the mold being spun on driven rollers while the molten metal is poured in through a tundish at the one end. The mold remains on the rollers only long enough for the metal to solidify. Then the mold containing the casting rolls away and is cooled in water sprays before the pipe is extracted. The mold then returns through the cleaning and coating stages before being fed back to the pouring point. It is normally necessary to keep eight to ten molds in circuit.

Mold temperature is kept at 356° F ± 86° F. The mold coating consisted of a mixture of carbon and clay applied as a film in one application. Mold lives of over 3000 pipes are obtained allowing for the fact that molds can be remachined to make a larger size.

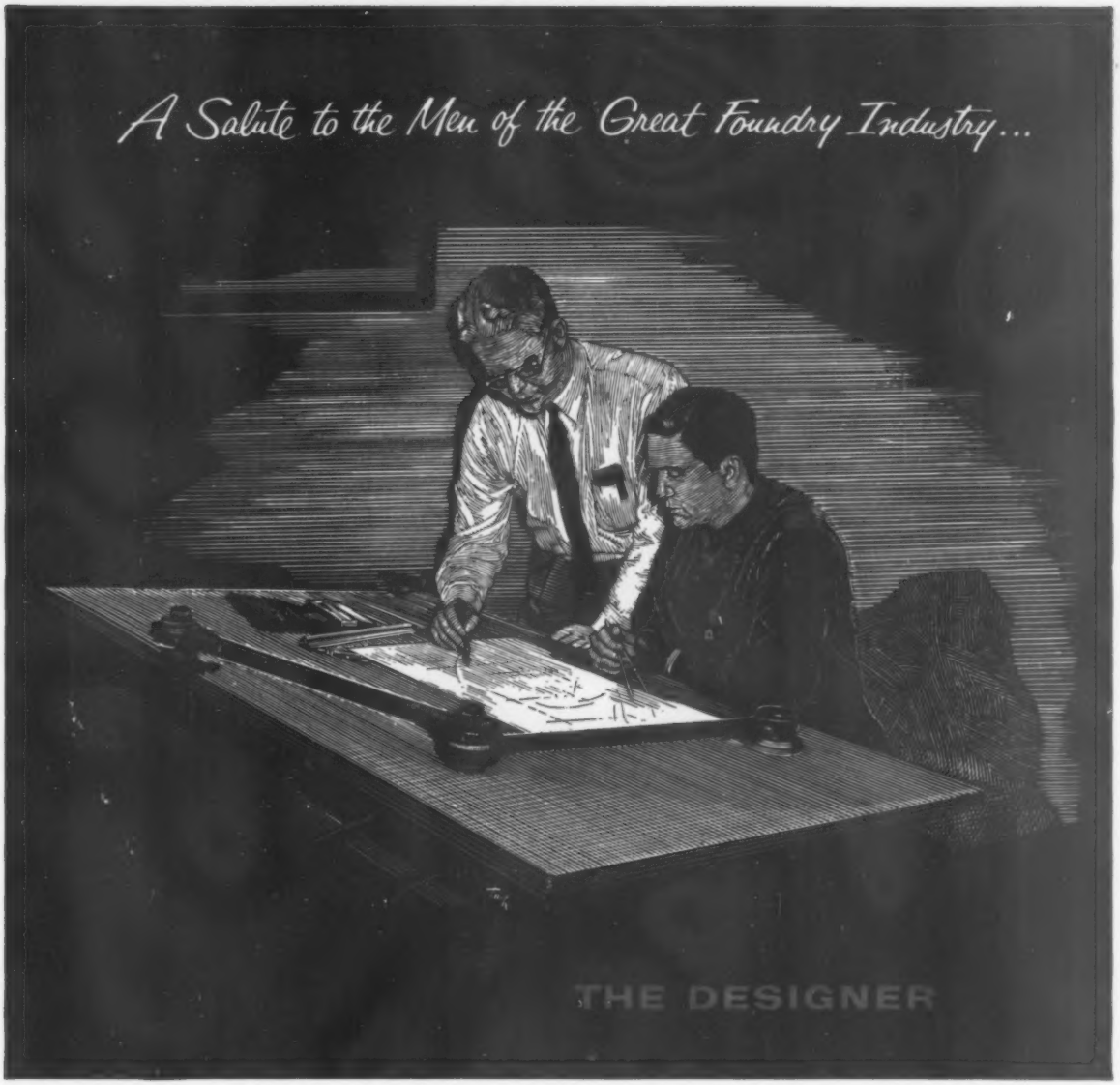
International Test Bar—G. N. J. Gilbert, British Cast Iron Research Association, gave a paper on the effect of specimen form on the tensile strength of cast iron. This work arose from the fact a wasted test specimen (the diabolo specimen) had been proposed as an international standard interchangeable with the ordinary parallel form of tensile test piece.

Mr. Gilbert's work revealed that the two test pieces did not give the same results but that the parallel specimen usually gave a tensile strength of at least one ton psi lower than that of the diabolo. The effect of the fillet radius and the effect of notching the test piece also were examined in detail. The author pointed out that the parallel test piece often was required for carrying out other test measurements such as on elongation or modulus of elasticity.

During discussion, E. O. Lissell of Sweden gave the results of an investigation carried out at the Sveriges Mekanforbund. These agreed broadly with the results published by Mr. Gilbert, though the difference between the diabolo and the parallel form was a little less.

A paper by A. E. Thornton presented recent developments in the centrifugal casting of high alloy steels and allied materials. These dealt particularly with the high duty castings required by the aircraft industry and with other castings such as oil engine pistons. Typical castings and their properties, structure, and consistency were described and illustrated.

G. L. Hancock and J. Taylor authored a paper dealing with specialized types of steel castings, those for high pressure turbine components. These castings were produced by



THE role of the Designer is one of far-reaching significance in the foundry industry. In addition to his ability to supervise the design and specifications of castings, he must have a thorough knowledge of the properties of the iron and the casting techniques to be used, the service conditions of the castings, and other factors such as the quality, cost and appearance of the finished castings.

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normal static methods. Details were given on pattern equipment and molding techniques, particular attention being paid to cement sand molds.

Dust Control—Experience of the British Steel Castings Research Association on the measurement and control of dust in foundries was present in a paper by A. H. Sully, C. M. Stoch, and J. M. Slater. The first part of the paper dealt with the general problem and control equipment available.

The second part of the paper described methods of suppressing dust. This can be effected partly by elimination of processes but more generally by ventilation, by good housekeeping, and by use of local exhaust systems at such spots as the knock-out or other places where castings are cleaned. Special attention has been paid to stand grinding machines, and the British Steel Castings Research Association exhaust hood which effects a remarkable improvement in the atmosphere around grinding wheels was described.

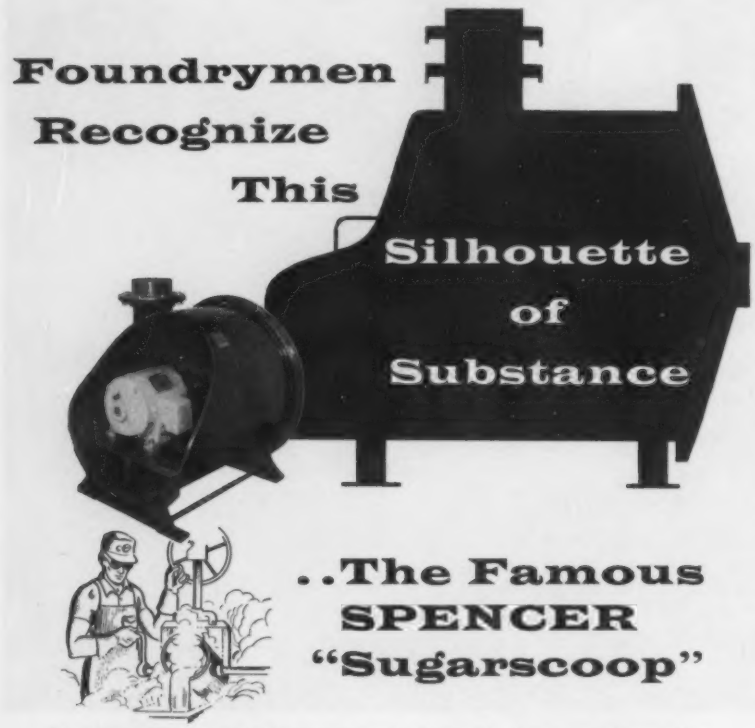
H. A. Burton of Montreal presented the American Foundrymen's Society exchange paper on practical application of reinforced epoxy resins for foundry use. Particular attention was paid to the technique of vacuum bag molding which is said to produce high quality, economical patterns. Epoxy resins for production of loose pieces in coreboxes and the use of chromium plated brass inserts for reducing wear at certain points of pattern equipment also were discussed.

A Buyer Comments—G. A. J. Begg discussed the buying of iron castings for chemical industry equipment. He made some rather unfavorable comparisons between the reliability of castings produced many years ago with those produced today. He drew particular attention to the importance of soundness and to the prevention of cracking and indicated that the use of high duty, high strength iron castings did not necessarily coincide with freedom from other troubles. He also claimed that the price of these large castings had risen faster in recent years than the price of other engineering commodities.

During discussion, statistics were quoted to show that the rise in price of iron castings had been less than the average rise in engineering prices. It also was suggested that engineers must be very clear and careful in making cast part specifications. In many cases high carbon irons of relatively low strength and low modulus of rigidity would produce sound castings. It is important that there be close cooperation between the founder and the customer in arriving at the proper casting design and material so that emphasis is placed on those points which mattered most in service.

A paper by A. P. Riley and T. Hurst on apprentice competition dealt with the techniques employed by the Tees-side Branch of the institute which has been successful in organizing good competitions. Details were given on the forms used, methods of marking, types of castings produced, how selections were made, and how patterns were circulated from foundry to foundry.

Gating Copper Alloys—W. W. Glick, R. S. Jackson, and R. W.



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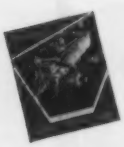

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Ruddle reported results of an investigation carried out at the British Non-Ferrous Metals Research Association on the running and gating of copper-alloy castings. For this investigation the alloys were divided into two main classes, those of the phosphor-bronze and gun metal types and those alloys of the aluminum bronze and high tensile brass types.

Conclusions were that simple running and gating systems were satisfactory for alloys not liable to severe drossing provided that choked systems leading to high entry velocity of the molten metal into the mold were avoided and that the various gates should each introduce metal at about the same velocity to avoid swirling. With the dross-forming alloys, the simple systems usually did not suffice, but the special systems and particularly that of Eastwood gave good results. Slot sprues and slot gates also were generally satisfactory and gave a good yield though they did introduce complications in molding operations.

Vertical Gating Methods

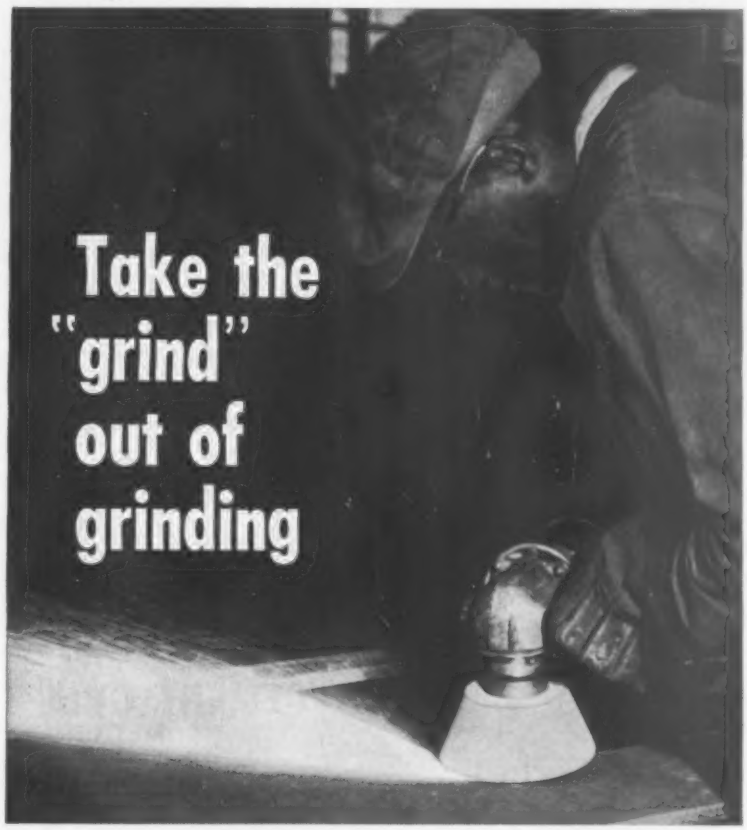
The vertical gating methods needed careful attention to gating ratios to strike a balance between cascading of metal through the successive gates or, on the other hand, reversed flow through the top gates. The paper included a note on the flow of liquid metal in shell molds which led to the conclusion that the rate of flow of molten metal through a given section was much the same as in green sand molds, but that the lower chilling power of shell molds allowed the molten metal to run farther and into thinner sections.

D. F. B. Tedds presented a paper on improved techniques in investment casting. Distortion of wax patterns during the two days after removal from the die can be reduced by holding them in plaster receiving fixtures immediately after they are extracted from the die. Vibration techniques used for application of the investments have been improved, and the use of polyethylene glycols has facilitated production of complicated patterns. These hard wax-like substances can be incorporated in the core and subsequently dissolved out in water. Other points covered included controlling the temperature of mold firing ovens and automatic control of metal pouring, the use of vacuum casting, and the production of refractory shells.

Metal Mold Casting—Factors influencing production and control of quality of aluminum alloy die castings were considered in a paper by R. R. Woodward and H. J. Proffitt. Methods of controlling directional solidification include a combination of gas burners to heat up parts of the die coupled with asbestos lagging in other parts and air cooling jets in others. Examples were quoted of automatic operation of permanent mold casting machines though the problem of automatic pouring had not yet been overcome.

Developments in pressure diecasting centered around fully automatic machines arranged in batteries with relatively few operators, coupled with the use of much higher injection pressures with corresponding changes in design of the machines.

Various diecasting alloys were discussed, methods of controlling prac-



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tice described, and a reference made to the use of resin-sand shell and CO_2 cores as aids to production.

A report of Technical Subcommittee 47 presented by Chairman L. W. Bolton dealt with the characteristics of coke as a fuel in the cupola and with the tests to assess those characteristics. A standard specification for cupola coke was suggested. The main conclusion of the report was that the most important characteristic of a good coke is consistency.

D. G. Evans, R. G. Higgins, and G. L. Kennedy from the Australian Branch authored a paper discussing University of Melbourne investigations on the production of a type of cupola coke termed "char" from brown coal found extensively in Victoria. The char is produced by briqueting the brown coal under fairly high pressures followed by high temperature carbonization. Ash content of the product is only 4 per cent and the volatile content about 2 per cent, but the material readily picks up moisture in storage. The main metallurgical characteristic is its high reactivity resulting in high carbon monoxide content of the stack gas and low metal temperature.

Those entering the discussion speculated on the uncommon association of a high carbon monoxide content with low metal temperature. It was suggested that this might be due to the wind belt pressure which was high in relation to air volume. It also was suggested that the shape of the briquets might alter the ratio between air volume and pressure.

A survey of ingot molds by K. G. Harries indicated that steel makers' requirements often controlled mold design factors. Service treatment, especially the factors which influence thermal history of the ingot mold, were important in determining mold life. The foundry casting the molds had to standardize very carefully the composition of the charge and foundry practice.

Of the normal elements present in cast iron, only carbon seems to exert a major influence on mold life, the best carbon content approaching the eutectic composition. Sulfur also should be low, and trace elements such as chromium and in particular lead, are harmful.

Foundry Mold Materials—Franz Hofman from Switzerland described modern concepts of clay minerals for foundry sands. The green bonding capacity of various clay minerals was studied as well as their resistance to heat. The methods of thermal analysis were described and examples were shown to illustrate how the characteristics of bonding clays could be predicted by these methods.

A paper from the British Non-Ferrous Metals Research Association presented by R. S. Jackson and W. W. Glick dealt with resin and sand economy and surface finish in shell molds. A variety of silica, zircon, and olivine sands was studied. Invariably, precoated sands gave higher strengths than mechanical mixtures of resin and sand containing the same amount of resin. Certain types of pick-up agents acted as lubricants, promoting closer packing of the sand grains, and, by raising the strength of the mixture, permitted a reduction in the proportion of resin by about 15 per cent. The use of reclaimed sand led to greater strength and was particularly important for zircon sands. If 90 per cent of the ma-

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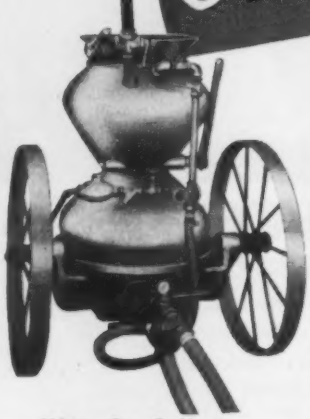

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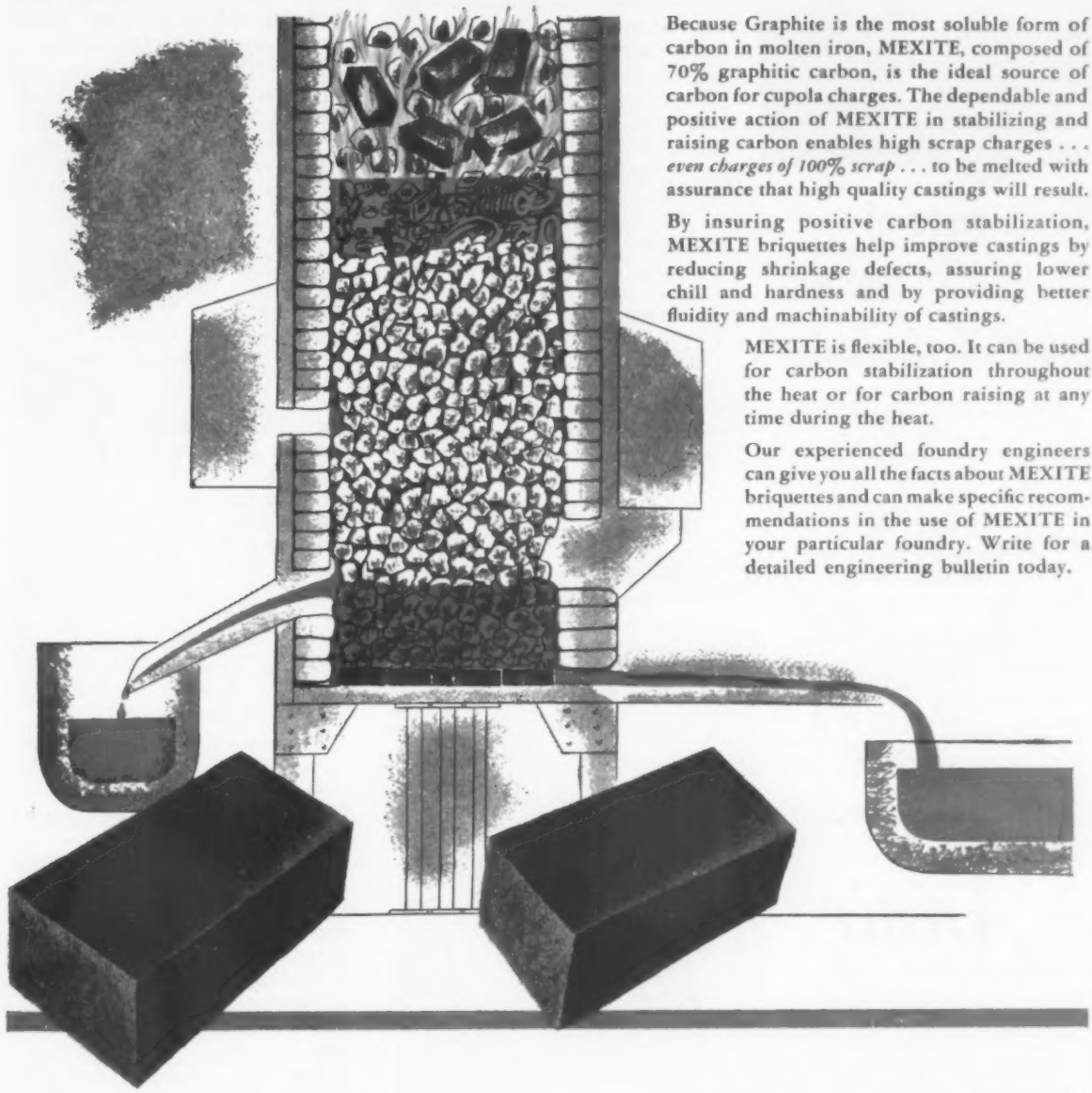

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terial could be reclaimed, the zircon sands became cheaper than silica sands since they required less resin; they also produced a superior surface finish.

Technical Subcommittee 46 report on the effect of mold material on the cooling rate and physical properties of cast metals was presented by Chairman J. Hird. This report also was presented at the 1959 AFS conference. Following the earlier work of the committee which showed that the cooling power of a sand increased as the ramming density increased and as the grain size of the sand increased, the present work dealt with the effect of these variations on the strength of cast iron produced under the widest possible variety of conditions.

The results showed that the structure and tensile strength of cast iron was influenced by variations in mold conditions. Changing from a soft-rammed fine sand to a hard-rammed coarse sand could increase the tensile strength of a given section of cast iron by about 20 per cent. The magnitude of the effect was confirmed in laboratory and production foundry work and clearly was due to changes in the cooling rate of the metal.

Discussion brought forth the suggestion that the report might be slightly misleading in relation to silicon carbide as a cooling medium as it had led to the actual chilling of test pieces, making it impossible to consider the tensile strength changes fairly.

"Cleaner castings and cleaner casters—that's the rule around here from now on"

Aircraft Casting Experts Attend Ohio Meeting

Casting experts from the three services, the Department of Defense, and industry gathered for a two-day meeting June 25-26 at Aeronautical Systems Center of Air Materiel Command, Wright-Patterson Air Force Base, Ohio.

Max Farmer of the Materials Advisory Board, Washington, and A. H. Langenheim, Dayton, Ohio, casting expert of the Manufacturing Methods Div. of the Systems Center, were co-hosts for the panel meeting. Thirty-five persons attended the meeting.

Castings, powder metallurgy, and the development of manufacturing processes for aircraft materials were topics of discussions.

Speakers and topics for the meeting included the following: Introduction by H. N. Bogart, Ford Motor Co.; John H. Garrett, Office of Director of Defense Research and Engineering, DOD, "Materials of the Future"; Col. P. L. Hill, Chief, Manufacturing Methods Div., the function of his division; C. J. Cosenza, Structures Div., Wright Air Development Center, "Performance Requirements and Utilization of Castings in the Air Force"; H. F. Metcalf, Naval Ordnance Training Center, "Naval Air Weaponry and the Potential Role of Castings in These Systems"; and K. N. Abbott, Ordnance Corps, U. S. Army, "Potential of Castings in Army Air Vehicles of the Future."

A discussion period was led by G. A. Starr, Chance Vought Aircraft, A. Hurlich, Convair Astronautics, and A. P. Binsacca, Northrop Aircraft.

Speakers for the second day's meeting were T. E. Operhall and Charles W. Schwartz, Misco Precision Casting Co., "Technical Considerations Covering the Adoption of Investment or Precision Castings to the Manufacture of Weapon Systems"; Nelson Spoth, Kolcast Industries Div., Thompson Ramo Wooldridge Inc., "New Developments Within the Industry that Show Promise of Meeting Air Vehicle Requirements"; James Smith, Oregon Metallurgical Laboratory, "The Potential of Shaped Castings of Titanium, Beryllium, and the Refractory Metals in Air Weapon Systems

with Emphasis on Rocket Motor Structures"; V. E. Zang, Unitcast Corp., "The Role of Basic Foundry Castings in Manufacturing Air Weapon Systems"; and John Varga, Battelle Memorial Institute, "A Resume of Aircraft Requirements for Castings and of Research and Development on Castings."

High Alloy Foundry Industry Elects 1959-1960 Officers

J. B. DEAR

Top executives of the Alloy Casting Institute were elected at the institute's annual meeting, at the Homestead, Hot Springs, Va. J. B. Dear, sales manager, Duraloy Co., Scottdale, Pa., was elected president to succeed Paul L. McCulloch Jr., president, Electro-Alloys Div., American Brake Shoe Co., New York.

Vice president for the coming year is J. S. Woosters, vice president, General Alloys Co., Boston. E. A. Schoefer, Garden City, N. Y., was re-elected executive vice president and treasurer.

Two new members named to the institute's board of directors are R. W. deWeese, vice president, Electric Steel Foundry Co., Portland, Oreg., and J. L. V. Bonney Jr., president, Bonney-Floyd Co., Columbus, Ohio.

Chicago and Wisconsin GIFS Management Groups Meet

The Chicago Area and Wisconsin Management Groups of the Gray Iron Founders' Society held their annual joint luncheon meeting June 16 in Waukegan, Ill.

Among guests were A. M. Nutter, E. L. LeBaron Foundry Co., Brockton, Mass., GIFS president, and Executive Vice President Donald H. Workman, and Field Director E. Harold Mitchell. All three commented on society affairs and current business conditions in the gray iron field. Mr. Workman outlined the marketing program which is about to be initiated.

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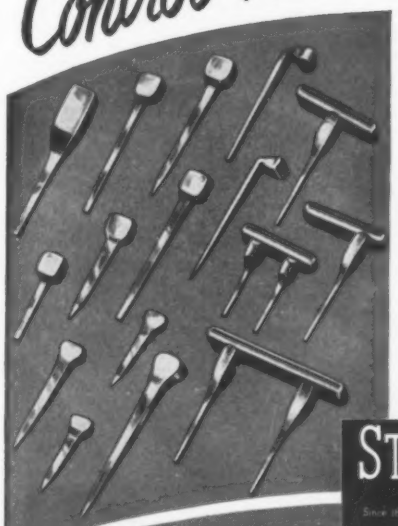

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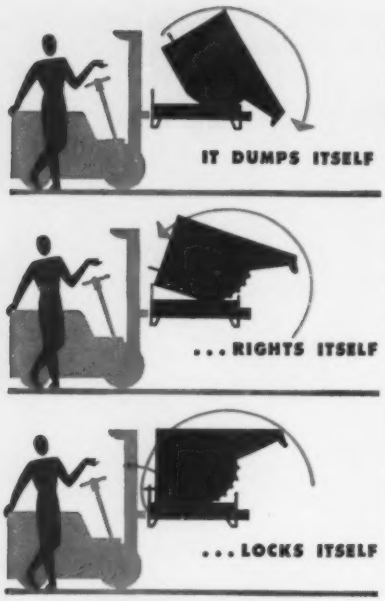

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Cochairmen of the meeting were Richard C. Mueller, Universal Foundry Co., Oshkosh, Wis., chairman of the Wisconsin Group, and Harold W. Johnson, Wells Mfg. Co., Skokie, Ill., chairman of the Chicago area group.

Principal speaker at the meeting was Howard E. Kroll, regional manager, specialized report department, Dun & Bradstreet Inc., Chicago, whose subject was "Establishing Sound Financial Policies." If an enterprise is to survive and prosper, five major functions must be performed with reasonable success, he said. These are purchasing, production, selling, administration, and finances. It was the latter topic to which Mr. Kroll devoted his attention.

He named these basic financial policies: 1. A company's investment in net fixed assets should be in proper relationship to its tangible net worth. 2. The working capital of an enterprise should be in proper proportion to its sales. 3. A company's investment in inventories should be kept within 100 per cent of its working capital.

Aircraft Castings Association Elects C. E. Haney President

C. E. Haney, works manager, Electric Steel Foundry Co., Portland, Oreg., was elected to the presidency of the Aircraft Castings Association at the annual meeting held in March in Los Angeles. Other officers elected at the meeting were William Stevens, Stanley Foundry, Los Angeles, vice president, and Dar Howell, Hanford Foundry, San Bernardino Calif., secretary.

Booklet Discusses Postwar Periods of Boom-Recession

Skillful timing of credit restraint and credit ease by the Federal Reserve System is "our strongest weapon against recession" or inflationary boom, the Chamber of Commerce of the United States asserts in a new publication, *Economic Lessons of Postwar Recessions.*

Credit restraint in boom times, according to the 31-page analysis of postwar ups and downs, leaves elbow room for easy credit when a recession threatens.

Nevertheless the study concludes, our ability to foresee trouble, to determine the severity of a recession once it has begun, and to recognize the beginnings of recovery still is feeble.

This booklet is available from the Chamber of Commerce of the United States, 1615 H St. N.W., Washington 6, D. C., at 50 cents per copy, with reductions for bulk orders.

Book Review

***Handbuch der Giesserei-Technik*, Erster Band, 1 Teil (Handbook of Foundry Technique, Vol. I, Part 1), edited by Dr. F. Roll, cloth, 892 pages, 7½ x 10½ in., published by Springer-Verlag, Berlin-Wilmersdorf, Germany. Price 136 D.M.**

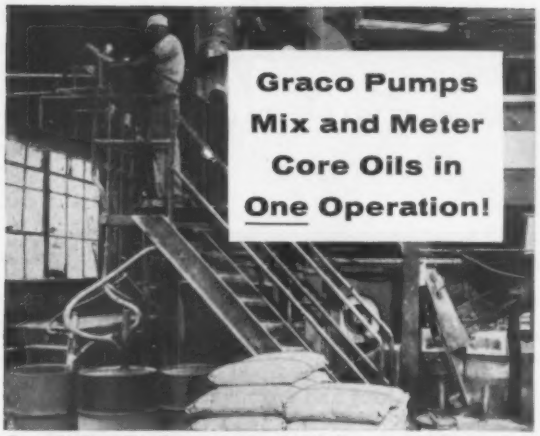
This German book is the first section of a four-volume series on techniques in the ferrous foundry prepared by well known authors.

Part 1 of volume I contains nearly 800 illustrations and opens with a discussion of the metallurgical problems of the foundry industry by Dr. E. Scheil, and is followed by a chapter on materials. That is divided into sections on steel castings by Dr. W. Trommer, on malleable iron castings by Dr. K. Roesch and U. Klein, on art castings by Peter Lipp, and on corrosion and wear of cast ferrous materials by Dr. H. Schiffers.

The next chapter on raw materials covers raw and auxiliary materials by Dr. Roll and the same author discusses molding materials. Testing or examination of molding sand and molding sand bonding agents is described by Dr. F. Hofmann.

The following chapter pertains to testing and describes chemical analysis procedures in iron and steel foundries by H. Pinsl and L. Pinsl, spectrometric analysis by Dr. O. Werner, mechanical or physical testing by Dr. W. Bischof, and microscopic examination by D. Ammann and M. Krichel. The chapter also contains a section on surface treatment by Dr. A. Hoch and on enamel and enameling by A. Kraeutle.

The volume concludes with a chapter on welding in which cast iron welding is discussed by Dr. C. Stieler, welding of steel castings by Dr. Trommer, and welding of malleable iron by Dr. Roll.



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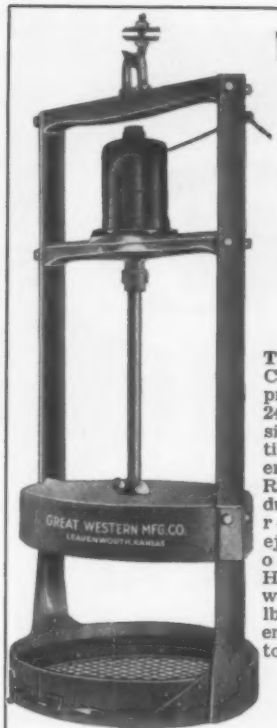

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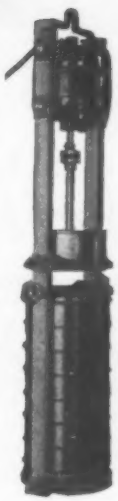

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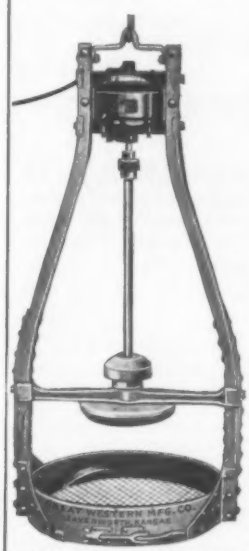

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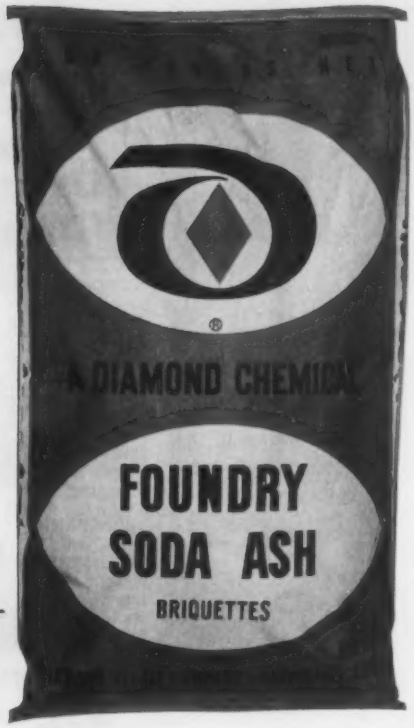

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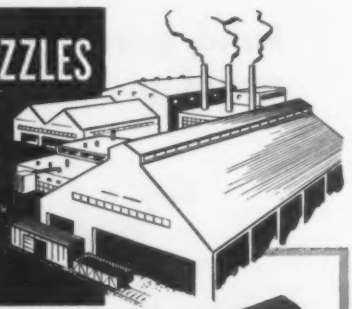

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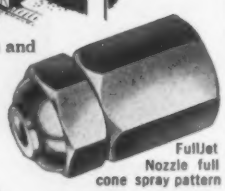

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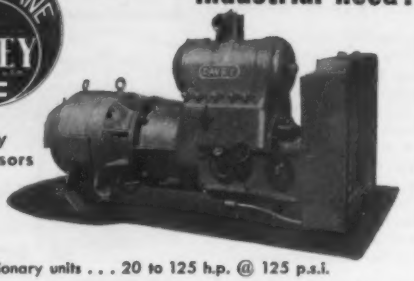

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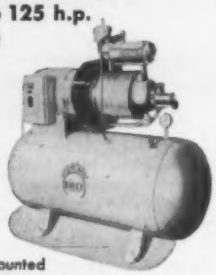

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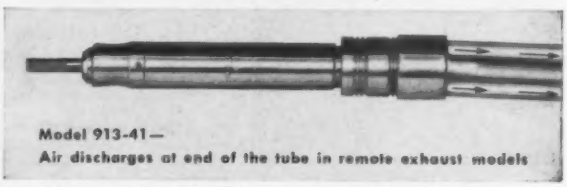

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Graduate analytical chemist. Experienced in steel analysis for foundry control. Capable of planning and supervising complete chemical analysis laboratory. East coast location preferred. Address: Box 602, FOUNDRY, Penton Bldg., Cleveland 13, Ohio.

FOUNDRY EXECUTIVE

SOUND TECHNICAL AND PRACTICAL BACKGROUND IN FERROUS CASTINGS. EXCELLENT SALES AND ADVERTISING MANAGEMENT RECORD. INTERESTED ONLY IN AGGRESSIVE GROWTH COMPANY. DESIRE POSITION AS GENERAL MANAGER OR SALES MANAGER. AGE 42 EMPLOYED. ADDRESS: BOX 607, FOUNDRY, PENTON BLDG., CLEVELAND 13, OHIO.

FOUNDRY SUPERINTENDENT

With 35 years' experience operating iron and steel foundries. Desire to make change. Engineering graduate. Address: Box 604, FOUNDRY, Penton Bldg., Cleveland 13, Ohio.

SUPERINTENDENT OR MANAGER

Progressive foundryman familiar with every phase of practical experience on all classes of work. Now employed. Would like to make change. Address: Box 596, FOUNDRY, Penton Bldg., Cleveland 13, Ohio.

MANAGER-SUPERINTENDENT

Practical gray iron foundryman, technically trained, graduate metallurgist with thirty years' broad background of experience producing quality castings in high production and jobbing. Well versed cupola, metal, sand control, modern methods. Desire contact with reliable organization needing services high calibre agressive foundryman. Results produced at minimum costs. Address: Box 595, FOUNDRY, Penton Bldg., Cleveland 13, Ohio.

FOREMAN OR GENERAL FOREMAN

Young aggressive foreman desires position in molding or core room departments. Experienced in steel and iron, graduate apprentice, journeyman, and foreman background. Willing to relocate. Address: Box 580, FOUNDRY, Penton Bldg., Cleveland 13, Ohio.

PATTERNMAKER ENGINEER

Pattern foreman with experience on intricate aircraft castings plus five years of engineering college, seeks position with top management potential. Address: Box 591, FOUNDRY, Penton Bldg., Cleveland 13, Ohio.

CORE ROOM FOREMAN

Age 39, 20 years experience in the core room, 12 years as a supervisor in iron and steel jobbing foundries. Desire job with future. Address: Box 570, Foundry, Penton Bldg., Cleveland 13, Ohio.

CORE ROOM FOREMAN

Steel foundry. Experienced carbon and stainless steel castings up to 2000#. Quality production—valves, pumps, etc. CO_2 and special sands. Located Eastern Pa. Address: Box 568, FOUNDRY, Penton Bldg., Cleveland 13, Ohio.

TRAINED STEELMOLDER

German, living in Canada, age 22, with seven years in various types of steel molding, seeking new connection. Prefer jobbing foundry. Willing to locate anywhere. Address: Box 571, FOUNDRY, Penton Bldg., Cleveland 13, Ohio.

PATTERN SHOP SUPERVISOR

Want position in aggressive foundry or pattern shop. 23 years varied experience in large and small foundry and pattern shop. 10 years supervision. Interested in planning and pattern engineering. Can furnish references. Age 41, married. Presently employed as supervisor. Wish to relocate. Address: Box 613, FOUNDRY, Penton Bldg., Cleveland 13, Ohio.

Positions Wanted

SALESMAN-SERVICE ENGINEER

Ten years successful selling and promotion of new products to foundries. Five years gray iron foundry management experience. B. S. Metallurgy. Address: Box 573, FOUNDRY, Penton Bldg., Cleveland 13, Ohio.

FOUNDRY SUPERINTENDENT

Practical and technical 25 years' experience jobbing and production in gray iron and semi-steel foundry. Familiar with every phase. Address: Box 589 FOUNDRY, Penton Bldg., Cleveland 13, Ohio.

MANAGER SUPERINTENDENT

Metallurgical and sales background. Technical and practical knowledge of all phases of ferrous and nonferrous production and jobbing foundries. 21 years experience as superintendent and Manager. Good troube shooter. Age 47. Employed. Address: Box 590 FOUNDRY, Cleveland 13, Ohio.

FOUNDRY CONTROLLER

Mature financial controller available. Many years iron foundry and heavy industry experiences. Address: Box 588, FOUNDRY, Penton Bldg., Cleveland 13, Ohio, or call (New Jersey) Sunset 9-0396.

CLEANING ROOM FOREMAN

Widely experienced, free to relocate. Address: Box 611, FOUNDRY, Penton Bldg., Cleveland 13, Ohio.

Foundry Consultants

FOUNDRY WELDING CONSULTANTS

Will train or improve your welders to do quality work on ferrous or nonferrous metals. Rewelding cost eliminated. 20 years experience.

GUETTERMANN WELDING & MFG. CO
635 UNION AVENUE
BELLEVILLE, ILLINOIS
PHONE ADAMS 3-0080

FOUNDRY CONSULTANT—NONFERROUS

Sand — permanent mold — centrifugal permanent mold — and centrifuge permanent mold. High pressure castings a sneciality. Address: ED JENKINS, 253—8th STREET, WEST PALM BEACH, FLORIDA, PHONE: TEMPLE 2-8685.

Wanted-To-Buy

FOUNDRY-WANTED-EQUIPMENT
STEEL—GRAY IRON

Foundry investment organization needs used equipment to activate and mechanize a large foundry. Complete foundry with or without property will be considered. Please be specific as to price and when inspection can be made. Principals only. All replies confidential.

BOX 616, FOUNDRY
PENTON BLDG. CLEVELAND 13, OHIO

FOUNDRIES WANTED
FERROUS—NONFERROUS

Production — Jobbing — Captive — Nationwide foundry investment organization. Complete foundry without property will be considered. All replies confidential. PRINCIPALS ONLY.

BOX 615, FOUNDRY
PENTON BLDG. CLEVELAND 13, OHIO

WANTED TO BUY

A used Simpson sand mixer Model No. 2H or F. State condition and price for immediate acceptance. Address: Box 603, FOUNDRY, Penton Bldg., Cleveland 13, Ohio.

WANTED

Used Simpson Porto Muller in good condition. Reply to: **MAGNET COVE BARIUM CORP., 576 NORTHWEST HIGHWAY, DES PLAINES, ILLINOIS, PHONE VANDERBILT 7-3276.**

WANTED

TABOR Power Yoke Type Jar-Squeeze stack molding machine. Quote specs age, condition and price. Address: Box 587, FOUNDRY, Penton Bldg., Cleveland 13, Ohio.

MIXER WANTED

Used Simpson Intensive Sand Mixers, State size, condition and lowest cash price for immediate acceptance. Address: Box 583, FOUNDRY, Penton Bldg., Cleveland 13, Ohio.

WANTED TO BUY

Two (2) Mold Machines—Davenport make, 40 AJS Jolt Pin Lift. Address: Box 601, FOUNDRY, Penton Bldg., Cleveland 13, Ohio.

Employment Service

FOUNDRY PERSONNEL SPECIALISTS

National Placement and Procurement of
GENERAL AND PLANT MANAGERS, PLANT SUPERINTENDENTS, FOREMAN—ALL DEPARTMENTS, METALLURGISTS, ENGINEERS, CONTROLLERS, ACCOUNTANTS, SALESMEN, SALES MANAGERS, PERSONNEL DIRECTORS, PURCHASING AGENTS

Confidential Inquiries Invited
From Employers and Qualified Applicants

For Fast Competent Assistance Contact
DRAKE PERSONNEL, INC. FINANCIAL 6-8700
JOHN COPE, DIRECTOR 29 E. MADISON ST., CHICAGO 2, ILL.

Representatives Wanted

MANUFACTURERS' REPRESENTATIVE
FOUNDRY ALLOYS

In order to provide better customer coverage and service, the world's largest manufacturer of secondary nickel alloys has several areas open for local representation. We manufacture complete line of nickel, nickel silicon, nickel chrome, ferro nickel, nickel copper, and nickel moly alloys, ductile iron additives and copper shot. We want top flight manufacturers' representatives who specialize in lines for iron and steel foundries. When replying, please state area you cover, manufacturers you now represent, and size of your organization.

ALLOY METAL PRODUCTS, INC.
2333 ROCKINGHAM ROAD
DAVENPORT, IOWA.

SALES REPRESENTATIVES

Here is an established competitively-priced line you can count on for a good income. Milward Alloys, a leading manufacturer with a strong reputation is now in the process of localizing many sales areas to give better service to customers and prospects from coast to coast. A considerable number of territories are open. We need men who will take them on, full or part time.

You may now be serving the trade or you may have foundry experience. Maybe you're retired with time on your hands. Reguardless of your situation, you will be amply rewarded—because Milward's line is broad and in constant demand. Milward alloys cut foundry costs. Orders are promptly filled. That's why we have a substantial reorder business.

The Milward line includes: copper shot; phosphor copper and other powerful deoxidizers and degasifiers; aluminum bronze and manganese bronze hardeners and ingots; copper silicon copper manganese, copper iron, copper aluminum and copper chrome alloys; nickel copper and nickel iron alloys; aluminum titanium, aluminum silicon, aluminum manganese, aluminum iron and aluminum copper and other alloys.

Phone or send us a letter describing the area or locality you can cover, whether full or part time, and tell us a little about yourself . . . your qualifications, experience, and when available. This may well be the connection you've been waiting for. Write or phone: Mr. David B. Milward, President. Phones: Lockport, N. Y. 4-0435, or Buffalo, N. Y. LUdlow 6425.

MILWARD ALLOYS, INC.
Lockport, N. Y.

AGENTS

To furnish sales leads or representation on sale of hot blast cupolas to iron and steel foundries and steel plants. Cupola and blast heaters offer radical improvement on current practice. Over 300 installations are in operation.

E. S. HARMAN CORPORATION
205 WEST WACKER DRIVE
CHICAGO, ILLINOIS

JOBBERS WANTED

We manufacture Kob-Kleen (ground corn cobs) for deburring, burnishing, polishing and soft grit blasting of metals, metal stamping absorbants, etc. Nationally advertised.

COEVAL, INC.
DEPT. H ST. JOSEPH, ILLINOIS

SALES HELP

United Oil has an opening for sales help in the Indiana and Ohio territory. Our post office address is: Box 1412, Erie, Pa.

SALES REPRESENTATIVE

We are interested in securing the services, on a salary plus travel expense basis, of an aggressive sales engineer to contact and sell the foundry trade. Must have a metallurgical background or equivalent practical foundry experience. Our company is prominent in its field, presently selling a widely used product to all types of foundries.

Man desired should not be over 40 years of age, preferably 30 to 35, free to travel extensively. Headquarters in a medium size midwestern town with moving expenses paid.

Send complete resume on education and experience and salary requirements. All inquiries held in strictest confidence. Please reply to:

BOX 614, FOUNDRY
PENTON BLDG. CLEVELAND 13, OHIO

MANUFACTURERS' REPRESENTATIVES

Affiliation sought—well established, expanding New England foundry with full facilities for manufacturing gray iron, brass and aluminum castings, invites financially attractive contact with manufacturer representatives.

BOX 610, FOUNDRY
PENTON BLDG. CLEVELAND 13, OHIO

REPRESENTATIVE WANTED

We have several good territories open on our refractory cupola gun mixes for cupolas and ladles. Our products well established with some of largest users. Address: Box 582, FOUNDRY, Penton Bldg., Cleveland 13, Ohio.

Opportunity

PERMANENT MOLD METHOD AVAILABLE

THE WAGNER PERMANENT MOLD CO., 2910 Empire Ave., Burbank, California, has developed a Permanent Mold Method for ferrous and nonferrous metals and invites inquiries from any country regarding this method and process

Engineering Service

MAGNESIUM PERMANENT MOLDS

Designed and Gated

Address Inquiry to:

BOX 585, FOUNDRY
PENTON BLDG. CLEVELAND 13, OHIO

Foundry For Sale

FOUNDRY FOR SALE

Fully equipped now operating gray iron foundry in western New York State for sale. Located near the New York Power Development. Reason for selling, present owners want to retire.

BOX 569, FOUNDRY
PENTON BLDG. CLEVELAND 13, OHIO

For Sale

FOR SALE

1—Dextrex Degreaser with temperature controls, steam pressure regulator, 2 baskets, size 70″ x 25″ x 12″. Purchased 1955, slightly used.
1—Rotary Lift Hoist. Model F5L2, purchased 1955, never used.
1—PRE2 Ingersoll-Rand Air Compressor, 24 x 12½ x 14 stroke, 210 HP, 440 volt synchronous motor complete with excitor, Serial No. 40569-40570.
1—Type #25 Size 8000 CFH DX Surface Combustion Gas Generator purchased new in 1956.

ALBION MALLEABLE IRON COMPANY
ALBION, MICHIGAN

FOR SALE

Two (2) International Core Blowers. Type SB 13—Serial No.'s 45923 & 56032-1 Complete with Hoppers and Dodge Steel quick change plates .....$1500.00 ea.
One (1) Tabor Cutt-Off machine, 7½ H.P. Motor 1000.00
Two (2) International Jolt Pin Lifters. Type JDR—Serial No's 82026-2 & 82026-1Y Size 1000x10 .....750.00 ea.
The above machines are in excellent condition.

CASTWELL FOUNDRY COMPANY INC.
P.O. BOX 170
MIDDLETOWN, N. Y.

FOR SALE

7—Whiting 2 ton Converters
3—Roots Connersville Size 20 x 30 Blowers
1—Roots Connersville Size 16 x 30 Blower
2—Fairbanks Morse 125 H.P., 880 R.P.M. Motors
4—Whiting 4 ton Ladles
2—Whiting 3 ton Ladles

BOX 572, FOUNDRY
PENTON BLDG. CLEVELAND 13, OHIO

CENTRIFUGAL INDUCTION MELTER

ECCO 16 KVA induction furnace, multi-gap type, complete with linked centrifugal casting machine. Semi-automatic operation. All equipment recently over-hauled. Located Midwest. Asking $1800.00. Address: Box 598, FOUNDRY, Penton Bldg., Cleveland 13, Ohio.

For Sale

FOR SALE

1. Tyler Shell Moulding machine. Almost new.
2. Hansberg Core Shooter. Two years old, seldom used.
3. Pangborn Table Blast. Good condition.
4. Various sizes of Fremont Flasks. Used.
5. Water Cooling Tower. Two-hundred gallon per minute. Good shape.
6. Roller Conveyor. Fifty ft. long, thirty-six in. wide. Good condition.
7. Oscillating Conveyor. Thirty feet long. Good condition—just re-built.

Call or write:

DIDION & SONS FOUNDRY CO., INC.
8070 WATSON ROAD
ST. LOUIS 19, MISSOURI
PHONE VICTOR 3-4722

FOR SALE

1—Screenerator—Large Model L
1—Handy Sandy H-S-7 Model
1—Royer Mixer—No Motor
1—250# Scale—Prints to ¼ lb.
2—Hydroblast Tumbling Barrels—Complete with compressor
1—2000# Type "RF" Strohman Power Tilt Furnace

All above in "ready to go" condition. Furnace relined recently.

CAPITAL BRASS & ALUMINUM FOUNDRY CO.
2700 N. CAMPBELL AVE.
CHICAGO 47, ILL.

FOR SALE
DETROIT ROCKING FURNACE

Type AA with cylindrical shell, 1200 lb. cold or 2600 lb. hot metal, complete with mechanical and electrical equipment, oil filled Kuhlman transformer, 11,000 volts primary, 125 volts secondary, 2800 amperes full load, installation drawings, unused and crated ten years. Ideal for alloy irons, brass or bronze. Price f.o.b. local cars $6,500.00. Address: HOPE ELECTRICAL PRODUCTS CO., 39 LONG AVENUE, HILLSIDE, N. J., ELIZABETH 4-7837.

FOR SALE

Patterns, tools, machines, j'igs, etc. for making complete line of hand and windmill farm pumps. Will sacrifice for immediate sale. Address: THOMAS KICKLER, 824½ MAINE, QUINCY, ILLINOIS.

QUALITY USED EQUIPMENT

4 Sand Blenders
B & P Models S-M-L
Royer Jr.
2 Redford Core Blowers-Bench Type
1 Shakeout table 3 x 4
4 Milwaukee Molding Machines Mods 104 & 105
1 Herman Rollover Machine
4 Crucible Melting Furnaces
35 Tight steel flasks—several sizes
20 Adams Snap flasks—several sizes
Many other items—Write for Bulletin #46

SOMIL EQUIPMENT & SUPPLY CO.
P.O. BOX #4
SOUTH MILWAUKEE, WIS.
PHONE SO 2-3880

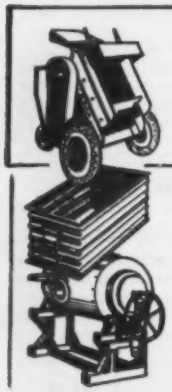
FOR SALE

Fisher Furnace, #600 MNP
Reda Reverberatory Furnace, Model 1000 CS
Eclipse Reverberatory Furnace, Model F2000G
Campbell-Hausfeld Stationary Furnaces
Skip Hoist for 9½ Foot Cupola—complete
Mold Conveyor 268′ long
Osborn #405 Rollovers
Vibrating Screens
International Rollover RES, Size 15″—6″
Milwaukee 163 Jolt Stripper
Champion J8L 12 Pin Lift, Jolt
Osborn 710J, Pin Lift
Osborn 212J, Jolt Squeezers
Osborn 275J, Jolt Squeezers
SPO 113 Jolt Squeezer
International L8J, Jolt Squeezer
International PJ8, Jolt Squeezer
Milwaukee 104 Jolt Squeezers
Champion J8 108 Jolt Squeezer
Arcade 1008 Jolt Squeezer
SPO 506 Jolt Rollover, Pin Lift, Draw
SPO 110 Jolt Squeezer
International Rollover 24-10 G, Portable
International Rollover 30 x 8, no jolt
J & J 610 Rollover, portable
International Pin Lifts
Davenport Pin Lifts
Osborn 559 Pin Lifts
International Type R core rollover, hand
Swing Grinders
Royer Sand Preparators
B & P Preparators
Blystone Sand Mixers
American Sand Cutters, Models M, AM, AA
Coleman Core Oven
Grinders, ½ hp to 25 hp
Disc Grinders
Ladles, from 50 to 10,000 lb.
Pouring Devices, 500 lb. to 2000 lb.
Gyratory Riddles
Tramrail & Switches
Dietert Permmeter
Dietert Universal Sand Strength Machine
Air Hoists, 1000 lb. to 10,000 lb.
Overhead chain conveyor #458, track, drives
Blowers—Centrifugal—positive-exhaust
17″, 20″, 28″, 36″ Stack Fans
Spencer Turbo Compressor, 3600 CFM @ 24 oz., 40 Hp. Motor
AAF Dust Collector, Type D, Size 14, Dry
AAF Dust Collector, Type N, Size 1½, Wet
AAF Dust Collector, No. 40 Air Mat Dust Arrestor
Spencer Centrifugal Dust Collector, Mutiple Vacuum Type, 300 CFM, @ 5″ of Hg., Vacuum
Turner & Hawes Dust Collector, Atomospheric Dry Filter Non-Automatic Type, Size 2500
Pangborn Dust Collector, Cloth & Screen Type Size 25,000 CFM

FLASKS
ALUMINUM
SLIP AND POP
SIZES FROM 10″ x 10″ TO 48″ x 48″
JACKETS
ALUMINUM AND IRON
STEEL FLASKS
CORE PLATES
TRANSITE—IRON

MANY OTHER ITEMS IN STOCK
SEND US YOUR INQUIRIES
WE BUY—SELL—TRADE

THE HOMAN MACHINERY CO.
1144 HARRISON AVE. MAIN 1-0339
CINCINNATI 14, OHIO



EUCLID FOUNDRY & MACHINE EQUIPMENT CO.

14919 SARANAC ROAD — CLEVELAND 10, OHIO

DUST COLLECTOR

1—Whiting Hydro-Clone, wet type, 4,000 c.f.m.
1—Detroit Uniwash

WHEELABRATORS

1—20″ x 27″, 2 cu. ft. Tumblast
1—4 ft. Tablast

MAGNESIUM CLEANING CABINETS

6—90″ x 100″ x 65″ with exhausters, 8000 c.f.m.

MOLDING MACHINES (Automatic)

2—TDA4 Taccones

CORE OVEN

1—Di-Electric, Model CD-25
Coleman, 30 KW.

SAND SLINGERS

1—B-P Riddle type, 19″ head, 4″ tip
1—B & P Dbl. Belt type, 19″ head, 4″ tip

SWING GRINDERS

10—10 H.P. Mummert-Dixon Model 1814
3—25 H.P. Safety Grinding Wheel Model 204

ELECTRIC FURNACE

1—350 lbs. Detroit Rocking

ASK FOR OUR COMPLETE LISTING — GLENVILLE 1-1222

For Sale

SAND BLAST EQUIPMENT
SELL-BUY-TRADE
GUARANTEED MACHINES
TERMS: 3 YEARS TO PAY

$70,000 worth new Pangborn and Wheelabrator parts. Priced 25% less than list.

6' LF-14 Pangborn Table	$2200.00
9' LG-14 Pangborn Table	4500.00
4' LF—Pangborn Table	2500.00
Pangborn 14 GK Barrel	2500.00
Pangborn 8 x 8 Room	2800.00
Pangborn 53 EN2 Hand cabinet	325.00
Pangborn Auto Peening cabinet	1100.00
48 x 48 Wheelabrator Tum. w/loader	4500.00
42 x 48 Wheelabrator Tum. w/loader	2500.00
15 x 20 Wheelabrator	1800.00
8' Wheelabrator Table Blast	2000.00
72" American Table Room	4800.00
14 LG5 Pangborn Rotoblast Multi-table 4/5—5' tables	9000.00
Pressure Tanks, all types	150.00 up
Vapor Blast cabinets	400.00

All types and sizes of Hand Cabinets, Dust Collectors Pressure tanks, Rooms, Horizontal or vertical Tumbling Barrels and additional Sand Blast Equipment too numerous to mention.

DIAMOND SALES, INC.
5654 W. Jefferson
Detroit 9, Michigan
VI-3-6750

FOR SALE

1—Simpson #0 Muller—Style M (never used).

1—Lancaster Stainless Steel Counter - Current Batch Mixer, Type LW-62.

1—Lancaster Mixer, Model EBG-4.

1—Lancaster Mixer, Model EAG-3.

1—Ingersoll Rand Air Compressor, Type PRE-2. 24" x 16", 100# pressure with 300 HP motor.

3—Link Belt Roto - Louver Rotary Dryers, Models, 207-10; 310-16 and 502-20.

R. GELB & SONS, INC.
U. S. HIGHWAY 22, RAHWAY VALLEY R.R.
UNION, NEW JERSEY

For Sale

REPAIR AND REBUILDING SERVICE ON ALL PNEUMATIC TOOLS

We try to carry a complete line of "Hard Chrome Rebuilt Tools" at about half the cost of new tools. Before you discard your old tools, why not send them to us for our estimate on the cost of renewing them with our Hard Chrome Process?

CENTRAL PNEUMATIC SERVICE COMPANY
512 LINDEN AVENUE
DAYTON 3, OHIO

FOR SALE

Robins Floatex Shakeout Unit 5' x 6' 12,000# cap. New 1951

Hough HA Payloader, 1951, Rebuilt engine, pneumatic tires

Jeffrey Vibrating Feeder 10' x 12' with 2.5 KW power supply, new 1950

Yale & Towne 3 Ton "Cable King" Hoist with pendant & trolley

Link Belt Steel Apron Conveyor 20' x 24' with Link Belt Speed Reducer & 5 HP TC motor for use under sand bin

Chaplets, 4000# tinned steel, purchased from iron foundry that ceased operations, selling at 30% of list, min. order 100#

MEECH FOUNDRY, INC.
9906 MEECH AVENUE
CLEVELAND 5, OHIO
MICHIGAN 1-5550

FOR SALE

Two Lindberg radiant fired electric furnaces complete with controls 440 V, 50 KW. Address: ALUMINUM MATCH PLATE CORP., 1500 MILITARY ROAD, BUFFALO 17, NEW YORK.

For Sale

FOR SALE

CHAINOMATIC (w/Magnetic Damper) 1/20th MG Sensitivity

CHRISTIAN BECKER BALANCE—like new condition

SHALCO MCM—7 Shell Core Blower (Semi-automatic) like New—used only a few hours.

SHALCO MIXER (Forath) Sand-coater for above Core Blower. Same as new, having been used a day or two.

ROYER Walking-Beam SHAKE-OUT w/hot sand Belt and ROYER AERATOR—completely rebuilt—most reasonable price.

MOULDER'S FRIEND—50" w/spare brush, rebuilt and guaranteed in every respect—one-way machine.

SHEPARD-NILES 5 Ton Monorail-type Cupola charging hoist (like new)—this is a real buy if you can use a heavy-duty charging crane (monorail)

INTERNATIONAL Jolt-Pin-Lift (Twin Cylinder) Rebuilt. Flask size—36" x 48".

OSBORN #559 Jolt-Pin-Lift (Portable or can be made stationary) Like New, never uncrated. Good buy.

For this and other good equipment, call or write:

W. O. McMAHON
BOX 5799, HOMEWOOD STATION
BIRMINGHAM 9, ALABAMA
PHONES: TREMONT 1-2088 or 9-6170

FOR SALE
MOTORS—GENERATORS
TRANSFORMERS
Unused—Rebuilt
WORLD'S LARGEST INVENTORY
ELECTRIC EQUIPMENT COMPANY
Phone station Collect GLenwood 3-6783
P. O. Box 51—Rochester 1, New York

FOR SALE

1—Used Style 104EOS-Series "2" Damler Core Blowing Machine-serial No. 3779-complete with 30" cylinder, with 10" draw stroke-without horizontal clamp-with roller conveyor equipped table. Has one ton vibratory sand feeding hopper with sand magazine of capacity to blow 150 lb. core. Inside dimensions at blow plate 24½" x 36¼" with blow plate 28" x 40". Address: Box 599, FOUNDRY, Penton Bldg., Cleveland 13, Ohio.

To Settle Estate

Land, building and equipment constituting the former plant of

THE ARROW PATTERN and ENGINEERING COMPANY

The plant is located at 1806 Nagle Road, Harborcreek Township, and is on the Rights-of-Way of the Nickel Plate and the New York Central Railroads. The land area is 300'x346.9'.

The main building is a cement block and steel structure with asbestos slab roof and is 60'x180' in size. This building was used and is equipped for a machine shop, pattern shop and foundry. In addition there is a tool shop 30x46 in size.

This property will be sold by the administrator of the estate of the former owner and will be sold through the Orphans Court of Erie County, Penna.

Direct all inquiries to Samuel M. Baker, Attorney-at-Law, 204 West 6th Street, Erie, Pa. Phone 4-4533.

Circle 872 on Page 85

UNIVERSAL REBUILT EQUIPMENT GUARANTEED

AIR COMPRESSORS
COMPLETE STOCK — BURY, PENNSYLVANIA, SULLIVAN, INGERSOLL-RAND —SEND YOUR REQUIREMENTS

BLOWERS
25—CENTRIFUGAL 16 oz., 2 to 5 HP
10—GE, WILBRAHAM - GREEN, FISHER Positive Pressure & Cent. Cupola Blowers

CLEANING EQUIPMENT & TUMBLING BARRELS
1—15" x 20" WHEELABRATOR Tumblast
1—20" x 27" WHEELABRATOR Tumblast
2—27" x 36" WHEELABRATOR Tumblast, one rubber belt, one steel conveyor
1—36" x 42" WHEELABRATOR Tumblast
1—48" x 42" WHEELABRATOR Tumblast,
1—24" WHEELABRATOR Swing Table
2—1-A WHEELABRATOR Multi-table with 6—26" aux. tables, 10—16" aux. tables
1—PANGBORN TABLAST, 8' Table, 2500 #
1—PANGBORN 6'LK Table Room
1—8LY, 68" x 32" Round
4—8LY, 48" x 36" Round

CONVEYORS
1—JEFFREY Car Type Mold, 23 cars, 100' track, cars 34" x 50"
1—HEWITT-ROBBINS Vibrating, 18" W x 10' L, Model VC-I
1—JEFFREY Ingot Mold, 3 compartment type 60" centers
1—LINK-BELT, CAR type mold, 114 cars, 403' track, car size 18" x 42"
1—SIMPLICITY, 24" x 10" Feeder w/hopper, Model OA-10-JA2

CORE BLOWERS
10—DEMMLER #1, #2, #2A, #3K, #4E
3—INTERNATIONAL SB-13
3—OSBORN #91, #192, #91-10
1—RANDALL MODEL "A," Bench Type
1—TACCONE #4D, 10" Draw Stroke Cyl.

CUPOLAS
1—#8 MORRIS w/vertical skip & blower
1—#9 MORRIS—never used
1—SKIP CHARGER for #9 Cupola with scale and buckets
1—WHITING Skip Charger for #5 Cupola
2—#5 WHITING with charger

DUST COLLECTORS
COMPLETE STOCK—both Wet & Bag Type —send us your requirements

FURNACES—DIRECT ARC MELTING
1—250 lb. LECTROMELT, Side Charge
1—2000 lb. HEROULT, 3/60, 800 KVA
1—1¼ Ton HEROULT
1—3 Ton LECTROMELT, Door Charge
1—3 Ton SWINDELL Hyd. Top Charge, 3000 KVA Transformer, Latest Type

FURNACES—INDIRECT ARC
1—60 # DETROIT
1—350 # DETROIT LFA
1—750 # DETROIT LFY, Conical Shell, hyd.
1—1000 # DETROIT AA, 300 KVA
1—3000 # Detroit C, 500 KVA

FURNACES—INDUCTION MELTING
1—35 KVA, AJAX SPARK GAP, High Freq., steel
1—75 KVA AJAX, 2000 # Brass
1—50 KW GECO, Steel

REBUILT & GUARANTEED
BEARDSLEY & PIPER
#70 Speedmuller
15 cu. ft. batch with Cooling and Skip Loader

FURNACES—GAS & OIL
1—225 # Gas, hand tilt.
1—400 # FISHER MNP, Gas Fired, Alum.
1—600 # STROMAN, Gas, "U" Type
1—1200 # Brass, MNP, Oil

FURNACES—HEAT TREAT
1—2' x 3' x 6', gas fired, 1800° F.
1—4' x 4' x 10' Gas Fired Annealing
1—9' x 12' Car Type, gas/oil
1—20" x 36" L&N Draw electric
1—10" x 24" x 60" Gas, double end doors
1—13" x 36" x8" high HAYES "Certain Curtain"
1—7' Rotary G.E.

MOLDING MACHINES
Jolt Rollover Pattern Draw
1—HERMAN 10,000 #, 48" x 100" table
1—HERMAN 6000 #, 42" x 78"
2—HERMAN 7500 #, 40" x 50" tables
1—HERMAN 7500 #, 40" x 60" table
1—HERMAN 3000 #, 30" x 66" table
5—HERMAN 1500 # to 30" x 48" tables
3—HERMAN 750 #, 24" x 30" tables
2—INTERNATIONAL, 13" x 17" tables
2—J & J #815RB, 30" x 40" table, 1200 #
1—OSBORN #602, 36" x 28", 900 #
1—OSBORN #405, 3000 #, flask size 64" x 57", 26" draw
1—OSBORN #42, 15" x 20", hand draw
4—TABOR 40" x 60", 1500 & 3000 # capacity
2—TABOR 30" x 40" w/air clamps, 1000 #
1—TABOR 22" x 42", pattern draw, shockless, portable, 600 #
1—TABOR 20" x 30", w/air clamps, 1000 #
2—TABOR 14" x 16" Rockover, 150 #

Plain Jolt
2—DAVENPORT, table sizes 24" x 27", 30" x 30", 1200 # to 1800 #
1—INTERNATIONAL, 3' x 4' table, 12" cylinder

Jolt Pin Lift
1—HERMAN #4317, 22" x 30" table
1—J & J #681-C, 30" x 25" table, 600 #
1—MILWAUKEE #1536, 32" x 38", 1500 #
1—OSBORN #559, 25" x 30" table, 6" draw, 1200 #
2—SPO #305, 750 lb., 20" x 27" table
1—TABOR 20" x 24" table, 600 #

Jolt Squeeze Pin Lift
2—INTERNATIONAL, PKL, 18" x 24" table, 12" sq., 5½" draw, stat.
1—MILWAUKEE #126, 21" x 27" table, 12" sq., 1200 #, 8" draw
2—MILWAUKEE #163, 15" x 24" table, 11" sq., 1500 #
2—MILWAUKEE #165, 24" x 30" table, 16" squeeze, 1700 #
5—OSBORN #712J, #712PJ, 18" x 28" table, 12" sq., 6" draw, stat. & port.
5—SPO #2114P, 21" x 27" table, 600 #
5—SPO #2136G, 21" x 30" table, 800 #

Jolt Squeezers
2—INTERNATIONAL #12 LJS, 16" x 20" table
4—INTERNATIONAL #10 LJS, 16" x 20"
1—NICHOLS #12 F-P, portable, 600 #
21—OSBORN #275PJ, #275J, 17" x 20" tables 10" sq., 400 #, stat. & port.
2—OSBORN #276J, 17" x 26" table, 13" squeeze, 500 # port
12—SPO #110J, 17" x 20" table port.
1—SPO #113 J, 18½" x 26" table, 13" cyl., port.

MATERIALS HANDLING
1—BYERS, Mobile Crane, BUDA Engine, 50' Boom, 5 ton w/magnet & bucket
1—HOUGH PAYLOADER, Model HA, 1000 # cap., hyd. lift, mech. dump

MULLERS AND MIXERS
1—B & P #70 Speedmuller, 15 cu ft batch with cooling and skip loader
1—B & P, Conventional, SIMPSON type, 87½" Dia. arranged for cooling
1—CLEARFIELD #404, 4' Dia, 4 cu ft batch
1—CLEARFIELD #610, 6' Dia., 10-14 cu. ft. batch
5—SIMPSON #0, U.D. 3' Dia. never used
1—SIMPSON #1, U.D., 4' dia., 4 cu. ft. batch
1—SIMPSON #2, 6' U.D. Dia, 14 cu ft batch
1—SIMPSON #3, 8' Dia. Open Gear, 20-25 cu ft batch

LADLES AND POURING DEVICES
Bottom Pour
4—MODERN, 49" x 49"
2—MODERN Crane Type, 55" H x 50" top
1—MODERN Crane Type, 60" H x 60" top
Lip Pour
1—WHITING 40" x 40" top dia. geared
1—WHITING 36" x 36", enclosed gearing
Cylindrical
8—WHITING, 26" L x 25" dia, 1100 # iron
7—WHITING, 19" L x 22" dia, 600 # iron
3—WHITING, 38" L x 28" dia, 2200 # iron
Pouring Devices
11—WHITING, 650 # to 2000 # gross cap.

OVENS
1—COLEMAN Oil, 1 compartment, 14'6" L x 80" H x 5' W
1—COLEMAN, Oil, Drawer Type, 70" L x 57" H x 48" W
1—COLEMAN, Gas, 2 Comp. and 5 drawers, O.D. 22" x 12' x 10'
1—GENRICH, Elec., 3 drawer, preheating, auto-control, 9' H x 8' W x 6'7" L
1—GENRICH, Electric, Rack Type, 7' W x 7' H x 5'3" L
3—GENRICH, Gas, elevator type, Inspection under operation in N.Y.C.—Excellent Condition
1—POREECK, gas, 5 drawer core oven
2—ROSS, Gas, 2 compartment, recirc., rack type, 6½' x 14' x 7'

SAND CONDITIONING
1—B & P Nite-Gang
2—B & P Screenarator, Model "B" & "M"
1—LINK-BELT Revivifier
2—ROYER, NC-2, 10-15 tons/hr, 1½ HP
1—ROYER PREPARATOR, Comb. Model NDC, 25 ton/hr scrap removal, 8' x 8' hopper
3—ROYERS, NDP, 15-25 tons/hr, 2 Hp

SAND SLINGERS
1—B&P Stationary, Single Speed
2—B&P Tractor Type, 16" head
2—B&P Tractor Type, 19" head

SHAKEOUTS AND SCREENS
1—ROBINS Vibrating Screen, 36" x 78"
1—SIMPLICITY 50" x 116" shakeout
1—SIMPLICITY Vibrex screen, 3' x 8'

TESTING EQUIPMENT
1—500,000 lb. TINIUS OLSEN Hydraulic Compression Testing Machine
BRINNEL Hardness Testers, Manual & Motorized

MISCELLANEOUS
1—HOWE WEIGHTOGRAPH SCALE, Model 1700
1—KANE & ROACH WIRE STRAIGHTENER, Model DX-5
FLASKS, CORE PLATES, All Sizes
1—CLIMAX Model 2-A Wire Straightener 10 or 15 HP GRINDERS Swing Frame
8—GRINDERS, Double End, Pedestal Type, U. S., Cin., Gardner, 5, 7½ & 10 HP

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BELTING
29" x 180' 24" x 152'
24" x 263' 24" x 120'

BLOWERS
INGERSOLL-RAND 13,000 cfm, 32 oz., 150 hp., 220 V
GE 10500 cfm., 20 oz., 85 hp., 220 V.
GE 7500 cfm., 20 oz., 89.6 hp., 220-440 V.
GE Centrifugal 6200 cfm., 24 oz., 58 hp. motor
NORTH AMERICAN 1050 cfm, 16 oz.
SPENCER 7350 cfm, 16 oz., 50 hp.
SPENCER 2250 cfm., 16 oz., 15 hp., 220 V.

CLEANING EQUIPMENT
Model 4836V-B VAPOR BLAST

CONVEYOR OVERHEAD CHAIN
1400' JERVIS B. WEBB and LINK-BELT #675 with trolleys 36" centers. 2-5 hp. Variable speed caterpillar drives, take-ups and turns.

CONVEYOR
17' BARBER GREEN Bucket Conveyor
30" x 25' Magnetic Belt Conveyor w/drives, 2 hp., 220-440 V.

CORE BLOWERS
DEMMLER #2, 20# cores
DEMMLER #2K, 20# cores
REDFORD Bench types, horizontal or vertical clamping
CB15 50# cores, Universal blow plate
DEMMLER #4 up to 250# cores
FEDERAL "SAN-BLO" CB 40
INTERNATIONAL SB15H, up to 150# cores. Hydraulic clamp and draw
INTERNATIONAL SB 13, up to 60# cores
INTERNATIONAL SB 12, medium sized cores
INTERNATIONAL SB 11, medium sized cores
6—OSBORN 193 up to 50# cores
OSBORN 2035-2 large sized cores

CORE GRINDERS
5—MILWAUKEE 70-9 & 70-12s
1—OWOSSO DE1-303 42" table

CORE OVENS
THERMONIC INDUCTION MODEL 1800A
5—DESPATCH, Gas Fired, 3 Drawer

CORE ROLLOVERS
INTERNATIONAL REDP Rollover 12" draw

CRANES
P&H 3 TON Electric Traveling DC motors 50' span
270' Crane Runway and Supports
10 ton MILWAUKEE; 48' span, 220 V.

CUPOLA GUNS
1—BONDACTOR #1250
BONDACTOR #1000

DIE CASTING
2—LAKE ERIE 800 ton Aluminum 58" x 89" die plates; 9# shot

DUST COLLECTORS
PARSONS 40 000 cfm. cloth bag type
ROTO CLONE, Size 6. Wet Type, 3000 cfm

ELECTRIC MELTING FURNACES
SINGLE PHASE
1—DETROIT "LFA" 350# shell 13200 V.
1—DETROIT "LFC" 700# & 350# Tapered Shell 2300 V.

FLASK HOIST—ROLLER CONVEYOR
NATIONAL 24": 8' long table

FURNACE TRANSFORMERS
1—"LECTROMELT" 800 KVA, 12000 V., 3 phase
1—WESTINGHOUSE 500 KVA, 11200 V., 3 phase
1—WESTINGHOUSE 2500 KVA, 13800 V., 3 phase

FURNACES NONFERROUS
CAMPBELL HAUSFELD Staty. pot type
1—HEVI-DUTY HD-181-S Pot type. Electric
2—400# FISHER Gas Fired Tilting Furnaces
4—600# FISHER Gas Fired Tilting Furnaces
1—600# FISHER Gas Fired Stationary Furnace
2—CAMPBELL HAUSFELD Oil Fired 625# brass hand tilt
1000# STROMAN DC double dipout w/complete controls

GRINDERS, SNAG
FOX 24" x 2" Single Wheel 10 hp.

GRINDERS, SWING FRAME
MARSCHKE 24" x 3" x 12" 20 hp., 220 V.
U.S. 24" x 3" x 12" 15 hp., 220-440 V.
2—MARSCHKE 3 hp., 12" wheel
1—B&D 7½ hp.

GRINDERS, MISC.
U.S. #70 Combination 20" disc and 20" x 3" x 1¼" wheel

HEAT TREATING FURNACES
HOLDEN #202 Electrode Type, Bright hardening annealing 1850°
LINDBERG 48" x 48" x 72" Elec., 1250°, box type.
BELLEVUE Gas Fired Annealing 20' x 48" x 18"
HAGAN Oil Fired Annealing 18'3" x 3'3" x 18" high

HOISTS
10 ton SHAW BOX electric hoist
4—INGERSOLL-RAND Air trolleys
1—500# INGERSOLL RAND LC-4
4—CLEVELAND 2000# Cab type hot metal carriers

LADLE MIXING
4000# Industrial, Insulated

MOLD BLOWER
TACCONE TD4 24" x 32" flask

MOLDING MACHINES
JOLT SQUEEZE PIN LIFT
3—#165 6B MILWAUKEE table, 24" x 30"
2—OSBORN 712 PJ 18" x 28" table
1 CHAMPION J8L10P 18" x 21" table 6" dr w
2—#2114G SPO table, 20" x 27"-11" cyl.
2—OSBORN 712 PV
MILWAUKEE #3548-6; 48" x 44" Tbl.; 12" Draw
MILWAUKEE #2542-3; 38" x 42" Tbl.; 12" Draw

SPECIAL! FACTORY REBUILDING
8—MILWAUKEE 2646 Jolt Squeeze Strip rolloff — rolling molding machines 10" jolt cylinder: 1800# capacity. 26" Squeeze cylinder: 13" draw. Flask size 25¼" to 29" wide, 52" long. New 1951. WILL BE FACTORY REBUILT.

JOLT SQUEEZERS
2—INTERNATIONAL, LJ812 16" x 20" table
4—CHAMPION, J810P 18" x 21" table
2—OSBORN 275PJ
2—MILWAUKEE 244 Jolt Squeeze car type head
MILWAUKEE 181-7, 24" x 36" table

JOLT ROLLOVER DRAWS
2—750# HERMAN 20" x 30" table
1—INTERNATIONAL RJ 20" x 12"
3—SPO 9032

JOLT PIN LIFTS
2—INTERNATIONAL 1200-S 26" x 27" table, 8" draw

PIN LIFT PUSHOFF
MILWAUKEE 620ND 20" x 24" table

MULLERS and MIXERS
1—#1 Simpson Muller
B & P #30 w/skip loader; multrol heating, cooling blower.

SAND CUTTERS
1—ROYER MCZ-43

SAND SLINGERS
1—B&P Tractor, 19" heads
B&P 2 speed 40/25 hp. double belt

SAND SYSTEMS
2—NEWAYGO SUPER HANDY SANDY; like new

SAWS, BAND
30" LAIDLAW, Metal Cutting hydraulic feed
42" TANNEWITZ, 5 hp., 220-440 V.

SAWS, CUTOFF
DELTA Abrasive cutoff

SHAKEOUTS
3' x 5' ROBBINS
3' x 5' SIMPLICITY
5' x 6' SIMPLICITY
4' x 10' SIMPLICITY

SHOT BLAST
SLY #4, 20" x 20" w/dust collector

SPRUE CUTTERS
2—PERKINS #53 1¼" stroke
1—MILWAUKEE #55 TON

TESTING EQUIPMENT
ARLIN Automatic Rockwell, continuous type
COLEMAN 55 Spectrophotometer
GOGAN Model 1414-2V
TYLER ROTAP Testing Sieve w/screens

TUMBLING BARRELS
1—ROYERSFORD, 42" x 72", chain drive, late
WHITING 60" x 72" 20 hp. drive
SLY, 24" x 42"; 3 H.P.

WHEELABRATORS
1—42" x 48" AMERICAN Skip Loader.
AMERICAN #2 Tumblast 8-28" tables, late
2—HOLLINGSWORTH 44" x 48" Wheelabrators

WOODWORKING—PATTERNSHOP
GARDNER 30" DISC and Spindle Sander
JONES SUPERIOR 48" Double Disc
BOICE CRANE 12" Planer
2—OLIVER 182D, 15" Disc Sanders
1—WALLACE 8" Jointer
1—CRESCENT 24" Planer
TANNEWITZ 42" Band Saw
ONSRUD W-244 & W-240 Routers
GREENLEE #495-S Tilting Arbor Saw
8", 12", and 30" Jointers
16", 32", 36" Band Saws

WIRE STRAIGHTENERS
1—#2A Climax ¼"

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AIR & ELECTRIC HOISTS

85—I & R Air Motor type, sizes LC3, A, B, C, D, D-6 & E, 300, ½, 1, 2, 3 & 5 ton.
15—DETROIT Air Hoists, 1, 1½, 5ton cap.
2—P&H and DETROIT Model LHR, 5 ton.
20—THOR air hoists, ½, 1 & 2 ton cap.

BUCKET ELEVATORS

12—LINK-BELT & JEFFREY, 30, 40, 50, 60 ft. cc, 10 x 7, 12 x 7, 14 x 7, 16 x 8 buckets.

CUT-OFF MACHINES

1—TABOR C16AF, 16" wheel, 10 HP.
3—TESSEMER H & I Sprue Cutters.

CORE BLOWERS

3—CHAMPION Model CB-10, CB-18, & CB-400. From 10 to 300 lb. Cores.
22—DEMMLER Model 1, 1E, 2, 2E, 2K, 3, 3E, 3K, 4 & 4E, 10 to 100 lb. Cores.
1—FEDERAL 40P-1 San-Blo.
7—INTERNATIONAL Model SB-11 & SB-13, SB-15H, 15 to 30 lb. Cores.
6—OSBORN Nos. 91, 92, 192 and 193. From 10 lb. to 75 lb. Cores.
3—MILWAUKEE #3A Bench Type.
2—REDFORD #2—Magazine type.
1—SAN-BLO Model CB-40-B, 40# Cores.
1—SPO Model SC-10-DM, hollow core.

CORE OVENS

1—INDUSTRIAL "Revolving Carriers" continuous, 18" x 80" trays.
1—THERMONIC Model M800A Dielectric. Cap. 900#s per hour.

CUPOLAS, BLOWERS & EQUIP.

1—SPENCER 150 HP 7500 CFM 48 oz.
6—I & R Centrifugal 30, 50, 85 and 100 HP. 3500 to 10,500 CFM w/blast gates.
1—MODERN No. 3½ Cupola.
1—CUPOLA Bondactor, style 1205-L.

ROTO-CLONES WET TYPE

9—AMERICAN AIR FILTER Type N&W, Sizes No. 20, 24, 27, & No. 30, w/sludge ejectors, cap. to 30,000 CFM.

ELECTRIC MELTING FURNACES

4—DETROIT LFA, 350# Cold Charge 700# Molten w/200 KVA transformers.
1—TOCCO 20 KW Induction, 9600 cycles.
3—AJAX No. 100 & 300 Furnaces Only.
1—DETROIT Size CM — 4000# Cold Charge, 3000# Molten, w/1000 KVA trans.
1—AJAX 50KW M.G. Set w/Furnaces—3000 cycle.
2—AJAX 20 KW Hi Frequency Converters.
1—TOCCO 75KW M.G. Set—9600 cycles.

GAS & OIL FIRED FURNACES

23—LINDBERG FISHER Model MNP electric Tilt. Sizes 150, 400, 600, 1000, 1700, 2000 & 2400#, alum. cap. Gas or Oil.
29—LINDBERG & HAUSFELD Stationary, Sizes 100, 150, 200 & 550 cap.
1—LINDBERG #400 BEI hand tilt.
1—LINDBERG #300, ATH, hand tilt.
1—SKLEENAR 1200# Rev., hand tilt.
1—MONARCH 600# Rev., hand tilt.
1—STROMAN, "U" 600# Reverb. Hand Tilt.
1—STROMAN DC "Dipout" 800# cap.
1—ECLIPSE E1000—Double Chamber Dry Hearth 1000# cap.

GRINDERS

Swing Frame

1—MARSCHKE 20" x 10" wheel, 10 HP.
3—MARSCHKE 24" x 3" wheel, 15 HP.
2—U. S. ELEC. Model 24, wheel 24" x 3".
1—MUMMERT-DIXON #2420, wheel 24" x 3".

Snagging

4—FOX #7—30" x 3" Wheel, 15 HP.
2—U. S. #64, 20" x 3", 7½ HP, 4 speed.
2—SAFETY #174, 24" x 3" wheel, 10 HP.
2—MARSCHKE 24" x 4" wheel, 20 HP.
1—U. S. #65, 30" x 3", 15 HP, 4 Speed.
U. S. No. 62VS, 24" wheel, 2-7½ HP motor, variable speed.

Core

2—MILWAUKEE 70-12, 70" dia. table.
1—STONEY Core Grinder, 16" dia. Wheel.

Horizontal Disc

GARDNER No. 124—53" wheel, 20 HP.
GARDNER No. 179, 70" dia. wheel, 40 HP.

LADLES

17—MODERN & WHITING Cylindrical Ladles, 275, 2450, & 3000 lbs. capacity. All Enclosed Gears.
37—MODERN & WHITING Lip Pour, Enclosed Gear, 1200, 1600, 2000, 4000, 6000, 7000, 8000 lbs. capacity.
7—MODERN & WHITING Mixing Ladles, 2 & 3 ton. Electric & Manual Tilting.

NATIONAL ENGINEERING CO.

2-ton sand reclamation system used to reclaim old sand to a new supply. Operated pneumatically with turbine-blower. In use 2 years. Can be inspected. Still installed.

MOLDING MACHINES

Jolt Squeezers

12—OSBORN No. 275-J—17x20 Table, 10"
15—OSBORN No. 276-J—17x26 Table, 13"
2—OSBORN No. 216-PJ—21-32 Table, 16"
6—MILWAUKEE 123—17x26 Table, 12"
2—MILWAUKEE 181—24x36 Table, 18"
10—INT. PVJS—17x26 Table, 12" cyl.

Plain Jolt

1—J&J 50 x 72 Table—5000# cap.
2—OSBORN 60" x 72" table, 5000# cap.
1—TABOR 36" x 36" table, 1000# cap.

Jolt Rollover Pattern Draw

1—DAVENPORT 28A, 28" x 44" table.
1—DAVENPORT 28-SA, 29" x 40" table.
3—HERMAN 1500 lb. Series, 26" x 48".
1—HERMAN 750 lb. Series, 20" x 30".
2—HERMAN 4000 lb. Series, 40" x 60".
14—INTERNATIONAL TYPE G, Sizes 20" x 8", 24" x 10", and 30" x 8".
2—J&J #612, 24" x 30" Table.
4—J&J #918, 44" x 54" Table.
1—J&J #815-B, 30" x 40" Table.
1—MILWAUKEE #167, 32" x 33" Table.
10—OSBORN #40 and 42 Core Rollovers.
1—OSBORN #442, 21" x 31" Table.
2—OSBORN #242W, 29" x 42" Table.
12—OSBORN #601 & 602, 30" & 36" Wide Flask, 10" draw, 750 lbs Cap.
2—OSBORN 643 Table 35" x 50"—2000#.
1—SPO No. 9546—26" x 32" Table.
1—SPO No. 917-A—40" x 29" Table.
1—SPO #413D, 24" x 25" Table.
1—SPO Model 508 table size 28" x 30".
1—SPO 5050, Table 25" x 30", 10" draw
3—TABOR 30" x 40" Table, 12" Draw.
4—TABOR 22" x 42" table, 10" Draw.

Jolt Pin Lift

3—INTERNATIONAL JDP 1600 x 10" draw, 36" x 36" Table.
2—J & J No. 688 25" x 30" table, 6" draw.
2—MILWAUKEE No. 1030—30x38 Table.
3—MILWAUKEE No. 3548—44x48 Table.
2—OSBORN #559, 25" x 30" table, 7" draw
1—SPO #3058, 22" x 28" table, 8" draw
2—SPO #3070, Table 26" x 35", 10" draw
1—TABOR, 22" x 32" table.

Pin Lift

2—B & P Model AL 2428 Speed Draw.
1—MILWAUKEE #620 ND Push

Jolt Squeeze Pin Lift

1—MILWAUKEE #125, 21" x 27" Table.
3—MILWAUKEE No. 165, 24" x 30" table.
3—MILWAUKEE #196, 17" x 38" Table.
1—OSBORN #712-V, 18" x 26" Table.
2—OSBORN #710-J, 17" x 21" Table.
9—OSBORN 714PJ, 20" x 31" Tables.
1—OSBORN 716PV, Table 22" x 34", 16" cyl.
1—OSBORN #818—24x36 Table, 18" cyl.
1—MILWAUKEE #246—23¼x42 Table, 24" cyl.
4—INTERNATIONAL PKL, 17" x 26".
2—SPO 2114P, Table 21" x 27", 11" cyl.
2—SPO 2160-R, Table 24" x 30", 16" cyl.

Shell Molding

1—SHALCO, Model HO4, 2 station.

CONVEYORS

Steel Apron

9—JEFFREY & LINK-BELT 24", 30", 36", widths. Lengths built to your specifications, with reducers & motors.

Oscillating & Vibrating

1—HEWITT-ROBBINS 24" x 120'—7½ HP.
1—LINK-BELT 45° x 154', 20 HP Motor.
7—JEFFREY TAYLOR No. 5 Vibrating Feeders 24" wide x 7'.
LINK-BELT "FLEXMOUNT"
1—8" W x 50' L x 4" deep pan
1—12" W x 21' L x 4" deep pan
1—12" W x 26' L x 4" deep pan
2—18" W x 18' L x 4" deep pan

Roller

2500' MATHEWS 6", 12" wide, 2 3/16" dia. roller, 1¼" hex shaft, 4" channel.
1500—MATHEWS 8" x 12" wide, 3½" dia. 1" hex shaft on 6" centers, 6" channel.

Mold

1—DUO-ROLL 88 Cars 20" x 48", 350' track, with automatic dumping.
1—PALMER "B" 106 Cars—42" x 62" w/550' Track.

Belt

LINK-BELT & JEFFREY 18", 24" & 30" wide. Flat or trough idlers, all Timken bearings. Built to your specifications. Can be equipped with molders hoppers & Ploughs.

HOPPERS & STORAGE BINS

7—NATIONAL & LINK-BELT Storage Bins, 60 to 150 tons cap.
1—NEWAYGO HS-7-GT, Handy Sandy.
42—MOLDERS Hoppers 1½ ton cap.

SAND MULLERS

1—B&P #30 Speedmuller 4 cu. ft. w/Loader.
1—B & P #60, Speed Muller, 12 cu ft.
2—B & P #70, Speed Mullers, 18 cu ft.
1—BESSER Paddle Type, 30 cu. ft.
1—CINCINNATI 24" muller.
2—CLEARFIELD No. 610 w/skip hoist loaders, 10 to 14 cu ft batch.
1—CLEARFIELD #404, 4 cu. ft. batch.
1—DRAVO-DOYLE 6 cu ft cap, Port.
1—LINK-BELT 48" x 8' Paddle Type.
1—PEKAY No. 160-1-24 Mixer Muller, single stage for 24" belt, 230 TPH.
1—SIMPSON #0, style C, 175 lb.
2—SIMPSON #2, Style C, 1500# w/loader.
3—SIMPSON #3, Style C, 3000 lb.
3—SIMPSON #3, Style UD, 3000 lb.
2—Mixer Muller, 6 cu ft paddle type.
1—LANCASTER No. EDG-4, 5 cu. ft.
1—LANCASTER #EA-4, 6 cu. ft. w/loader.

SAND PREPARATORS

6—B & P Screeenerators, Models S, M & L.
8—ROYER Models, NC-4, NDS, NDP.
6—AMERICAN Sand Cutters, Model M, Sizes 79/60, 89/70, 99/80. All late.
4—AMERICAN Model AA and AM, 45" & 60" Cutting Blade.
1—AMERICAN "Sand Master," 102"/70" Cutting Blade—1952.
2—MOULDERS' FRIEND 50" & 60" Brush.
2—NEWAYGO RS-V Reddy Sandys.
1—SIMPLICITY LP 2' x 3' screen.

SANDSLINGERS

1—B & P Motive Jr., 300 cu ft tank.
2—B & P Tractor Type 19" head & 16" head, 13' arms. Magnetic towers.
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1—SIMPLICITY 4' x 8' Model D.
1—SIMPLICITY 4' x 10' Model D.
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2—AMERICAN 36" continuous Tumblasts
1—AMERICAN 20" x 27" w/dust collector.
1—AMERICAN 36" x 42", w/skip hoist.
2—AMERICAN 48" x 42", w/skip hoist.
1—AMERICAN 27" x 36", w/skip hoist.
1—AMERICAN 48" x 48", w/skip hoist
1—AMERICAN 48" x 72" w/loader.
1—AMERICAN #3 Tablast, 4—48" tables.
1—AMERICAN #1 Tablast 7-14" tables.
1—PANGBORN #45, type MT Sand Blast Room 10' L x 5' W x 6' H.
1—PANGBORN Model 6-LF, 6' diameter plain table with dust collector.
1—PANGBORN 6 LG-14 Multi-Table, 6-24" tables, w/dust collector.
1—PANGBORN Model 14GK-7 Roto-Blast barrel w/loader.
1—PANGBORN 9LG-14 Multi-Table w/6—36" dia. Aux. Tables w/Dust Collector.

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Oscillating Conveyor, Pan type, electric vibrator 10′ long 36″ wide
Sand Storage Hoppers, 150 ton capacity, each
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Simplicity Shakers; screen type for sand 4′ x 10′ and 16′ x 34′; for molds and castings, 4′ x 10′ and 3′ x 6′
Simplicity portable screenarator
Toledo Scales 48″ x 60″ and other sizes
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Zig-Zag conveyor 800′ and carriers

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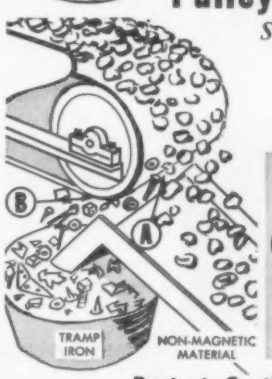

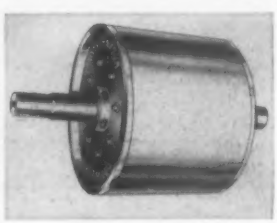

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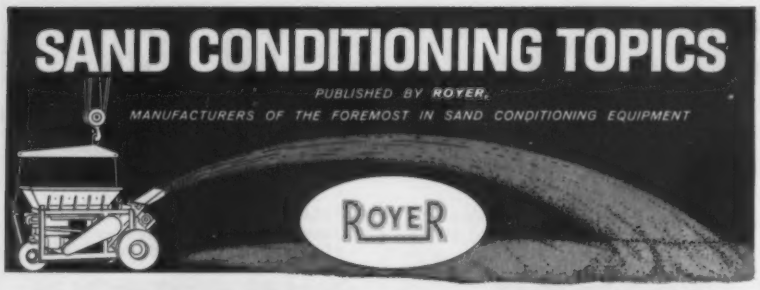

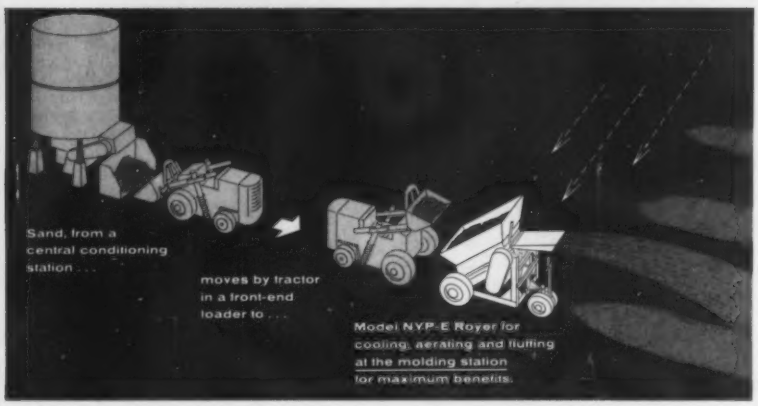
Sand, from a central conditioning station . . .
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FOUNDRY is edited primarily for management, production, technical and purchasing personnel in foundries. A copy is sent at no cost to each metal casting plant in the U. S. and Canada employing 20 or more workers and to selected smaller foundries. Additional copies are sent to each foundry to the extent necessary to serve key foundry personnel on an individual or routed basis. A limited number of copies is supplied at no cost to educational institutions.
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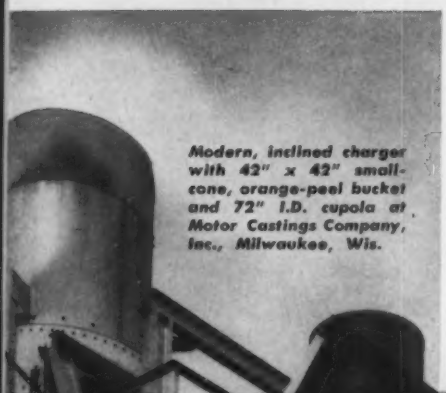
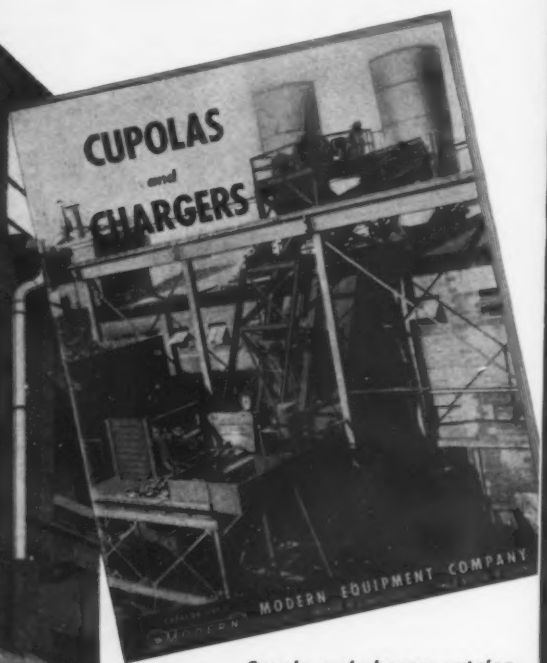


Modern, inclined charger with 42" x 42" small-cone, orange-peel bucket and 72" I.D. cupola at Motor Castings Company, Inc., Milwaukee, Wis.



Cupola and charger catalog, with water-cooled supplement, will be mailed on your request.

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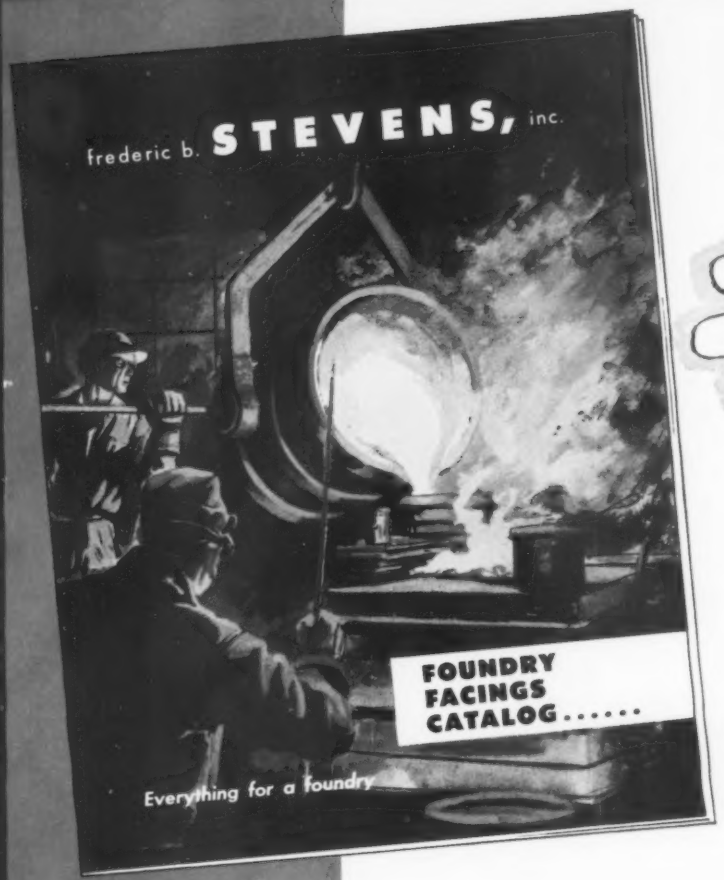

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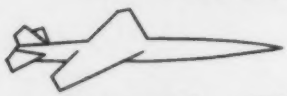

Shreveport, La. —HICA, INC., reports that shell molds made with Reichhold's FOUNDREZ 7504 powdered phenolic resin produce "High Integrity CAstings" for manufacturers of chemical and milk processing equipment, aircraft, missile, pump, valve and burner parts. HICA pours stainless and other alloys on intricate jobs requiring extremely close tolerances.

HIGHEST DEPENDABILITY

In a recent interview Phillip R. Johnson, HICA shell molding foreman, said "The dependability of RCI's FOUNDREZ recently helped us supply a large order of complicated castings without a single reject by our customer. With FOUNDREZ, we are able to avoid the warpage and cracking frequently encountered with other resins. Nor have we experienced any problem that could be attributed to our use of FOUNDREZ."

HICA *team ready to close cope and drag halves of plug valve handle adapter mold after cores have been set in place.*

HICA'S *shell molding department. Up-to-date methods and machines help produce accurate, economical castings.*

ECONOMY IMPORTANT

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Reichhold's FOUNDREZ 7500 series of powdered phenol-formaldehyde resins, designed especially for shell molding, includes:

FOUNDREZ 7500 — a general purpose phenol-formaldehyde resin. Features long flow and cure. This product is especially applicable to intricate-pattern work.

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FOUNDREZ 7506 — has the shortest flow and fastest cure of the series. Compounded for high speed production of shells. Most suitable where foundry production involves long runs of a few types of castings.

If you would like further information on the FOUNDREZ 7500 series, write for Technical Bulletin F-3-R. Reichhold Chemicals, Inc., RCI Building, White Plains, New York.

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